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VOYAGER

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ON THE COVER
The Starship 'Enterprise' sails into adventure in 'The Wrath of Khan', our main feature in the premier issue of New VOYAGER. At left, the renegade Khan (Ricardo Montalban). Photos: United International Pictures (UK).

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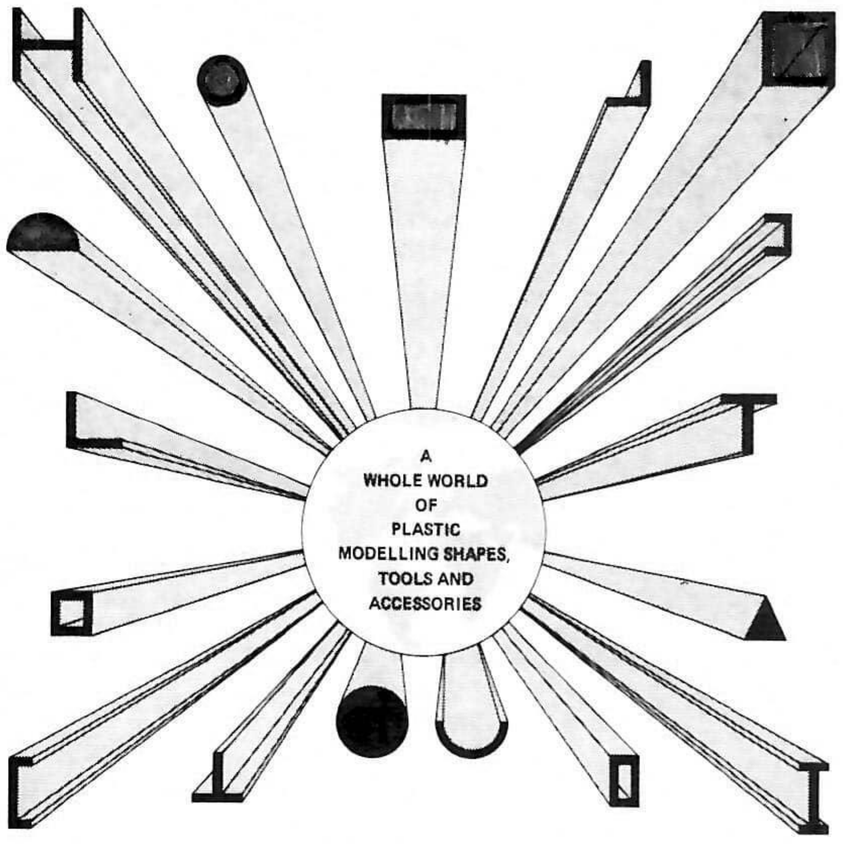

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CAPTAIN'S LOG

The new venture continues . . .

Over 45 000 can't be wrong! That's a conservative estimate of how many readers worldwide acclaimed *Space VOYAGER* as one of the finest magazines of its type ever published. Now we're back as *New VOYAGER* with the same editorial team dedicated to providing the best possible material and to consolidating the success of the first issue of our magazine.

In the intervening months between publication of *Space VOYAGER* and *New VOYAGER*, we have been greatly encouraged by a massive response to our questionnaire – and thanks to all those of you who spared the time to complete it – which has provided us with valuable information on the kind of magazine that is wanted. We also received a fair measure of practical criticism as well and this will prove more then beneficial when planning future issues. Some changes have been implemented already and ideas for future articles carefully recorded and passed on to our team of contributors.

Initially, *New VOYAGER* is being produced on a quarterly basis for the immediate future but, if demand warrants, strong consideration will be given to increasing regularity in the months to come.

I hope that this premier issue will prove as popular as *Space VOYAGER* has been and please don't be afraid to let us have your comments or opinions and, of course, what you'd like to see covered in future editions.

Two quarter century anniversaries

Congratulations, albeit a little belatedly, to Patrick Moore for 25 years of *The Sky at Night*. This has to make it the longest running original format programme in this country; possibly the world.

The anniversary programme itself took Patrick on a round-the-world tour of present day astronomical sites and showed the work being done. A celebratory lunch also took place at the Television Centre that week, attended by many people associated with the

programme over its many years of transmission. Patrick cut the specially made cake (see above) and Aubrey Singer, managing director of BBC Television, presented him with a new pair of binoculars – to replace those Patrick had recently dropped – and a specially-commissioned painting depicting Patrick batting against a team of aliens on the Moon!

Also celebrating its 25th birthday is the Space Age itself. The world's first artificial satellite, *Sputnik 1*, was launched by the Soviet Union on October 4, 1957. Since that date the growth in technology has been seemingly inversely proportional with the first attempt at an active communications satellite from *Telstar* producing its fuzzy black and white images – we now take the global network of comsats for granted; early crash-landers on the moon giving way to the manned flights, and fly-by missions to the planets, culminating in the magnificent views of Jupiter and Saturn from the *Voyager* probes.

In our second issue we will be taking an illustrated look at the 'firsts' of the space age, starting with the first artificial satellite and coming up to date with the first launch of a 'second-hand' spaceship.

Errata – *Space VOYAGER*

Considering the speed in which the pilot issue of *VOYAGER* was produced, remarkably few glitches crept in. Apart from several typesetting literals there were a number of factual errors that require correction.

Pages 2 and 3

The caption, to be absolutely correct, should have read 'LM' not LEM. The latter, standing for Lunar Excursion Module, was the original abbreviation when all NASA initials seemed to come in the form of three letters forming a convenient acronym – Lem rolls conveniently off the tongue! However the 'Excursion' part was later dropped; perhaps it made it sound too much like a holiday outing?

Page 37 and Blake's 7

Servalan's ship, centre right, was printed upside down, though in space does this really matter? Designer of this particular model was Steve Drewett.

Pages 42 and 43 and the Landspeeder

Although it was mentioned in the text in passing, it should have been made clearer that the drawing of the *Landspeeder* was based on early drawings which also made it left-hand drive.

Page 51 and Satellite TV

The top two photographs of the Video Disc systems should have been credited to Tony Auger, who also made the large scale micro featured in the lower picture.

Page 64 Space Model Survey, bottom photos

The **Addar** model of the Apollo Soyuz Test project is on the right, not left, of the picture.

Page 72

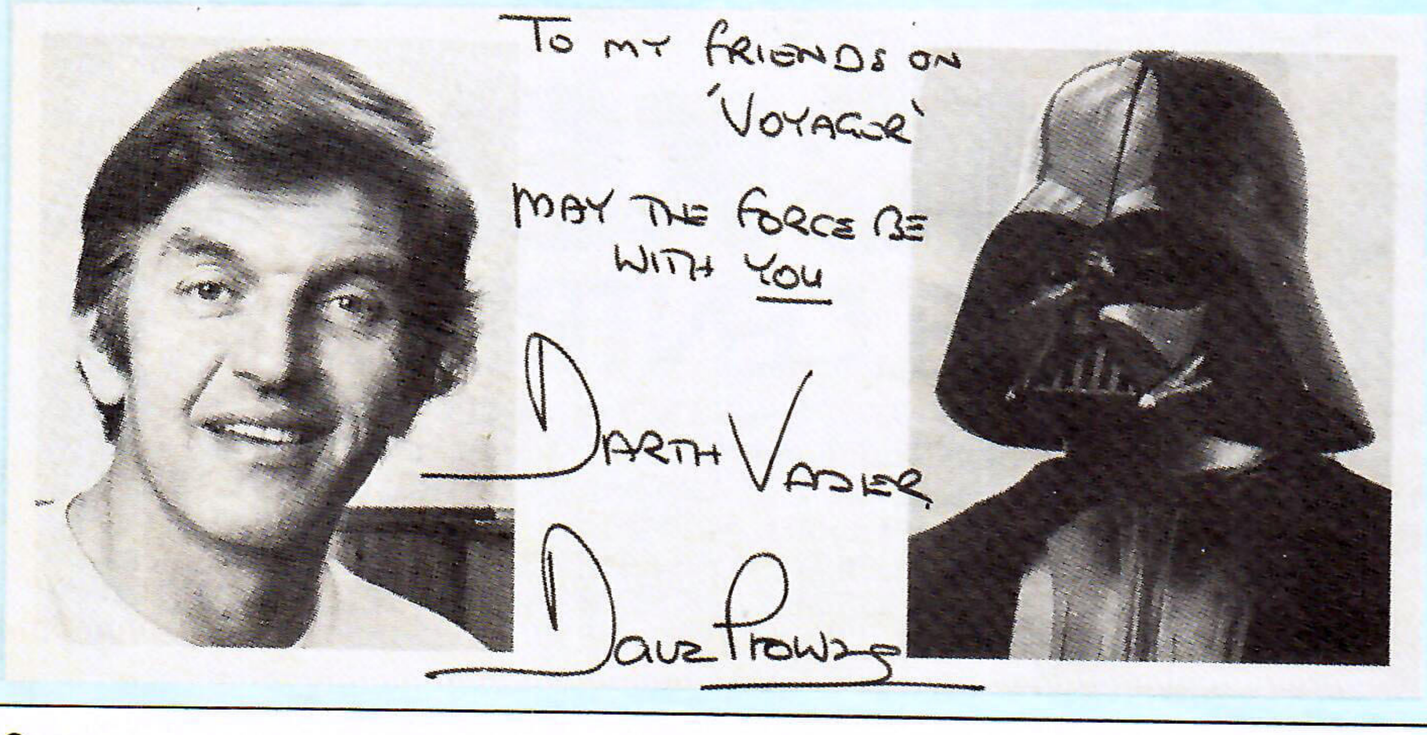
Astro 1 crept into the *Captain Scarlet* lists.

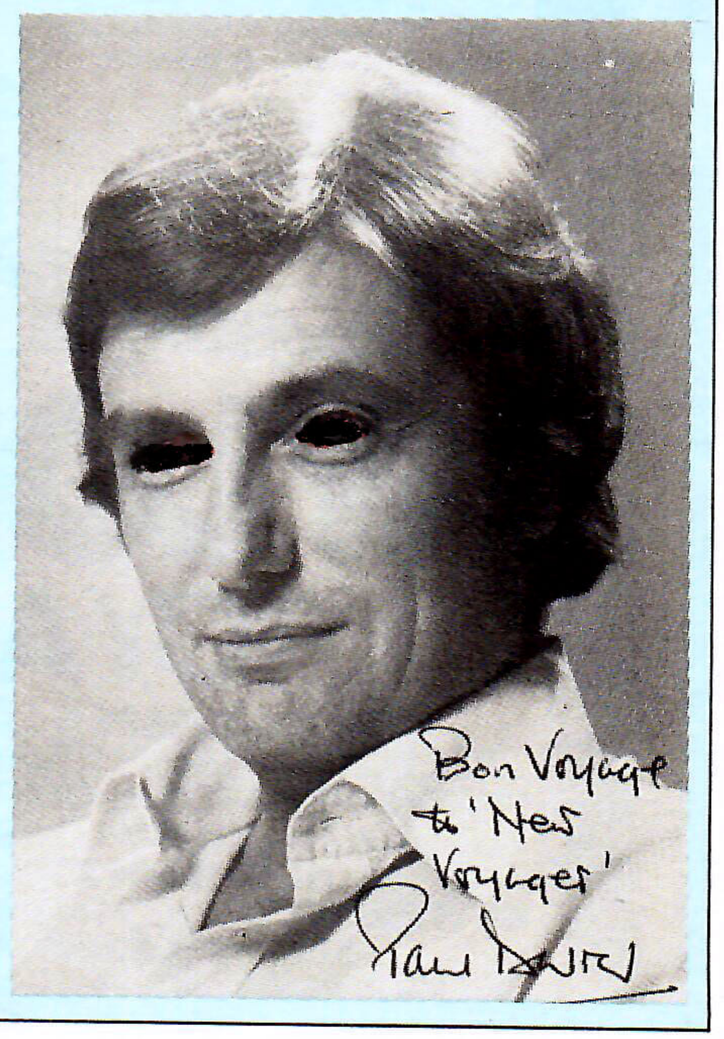
Page 73

The *Blue Noah* scales are irrelevant. The list also omitted, by error, the **MPC/Airfix** *Space 1999 Hawk* and the **Revell** *Alien Invader Shuttle*. These were kits that were known about and/or available at the time of the list and there have been a few more since.

Ray Rimell

It's a comfort to have friends in high places! Welcome goodwill messages from Dave Prowse ('Star Wars') and Paul Darrow ('Blake's 7') support the launch of our premier issue.





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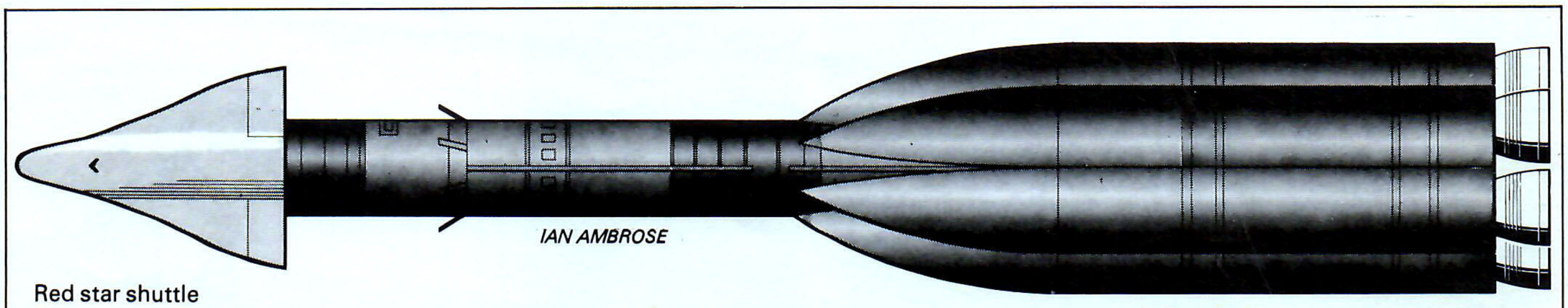
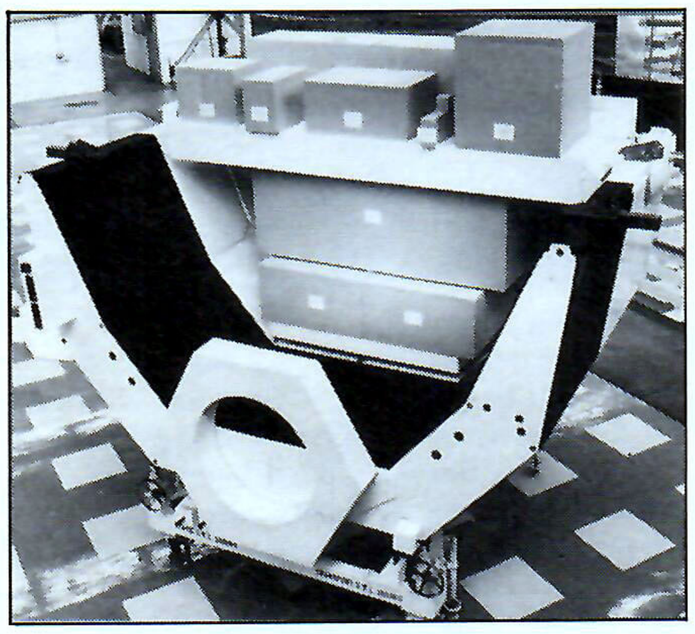


IAN AMBROSE

Red star shuttle
Rumours of a Soviet Shuttle seem to be accurate. *Aviation Week and Space Technology* reported that a sub-scale Soviet shuttle was launched on June 3, from the Kapustin Yar launch site. Recovery was from the Indian Ocean, probably by parachute, which is rather unusual for the Soviets who normally recover craft over land.

The *Raketoplan* has to be much smaller than the Shuttle, and is thought to resemble the old USAF X-24 'Dyna-Soar', which only reached the mock-up stage. Launch of the full-size version would probably take place atop of the D-Type launcher, the type that launches *Salyut* and the planetary probes.



The Super-pallet
British Aerospace, who build the pallets for Spacelab, have put forward a suggestion that the units should be used as free-flying structures. They would be equipped with a variety of experiments which require a longer time in orbit than normally provided by a Shuttle mission. Taken up in the payload bay, as per a normal pallet, once in orbit they are released. When the necessary time has elapsed, they can be collected by the same method. The pallet is ideally suited to this type of adaptation. It already fits very conveniently into the payload bay and is already designed to have a variety of different experiments and equipment attached to its various surfaces.

Component TV
The Space Age television receiver comes much nearer with the introduction of **Sony**'s new *Profeel* system. Until now, the approach to a television set has not changed since it was first invented. Obviously modern sets are far removed, technically, from that wooden cabinet, its little black and white picture tinged mauve, a smell of burning bakelite prevailing, that sat in the corner. But modern sets still sit in the corner, with everything packed into one case, invariably with sound coming a poor second whatever manufacturers might say. Sony have taken the unit system approach that they, and all other manufacturers, have with audio. Consequently the Profeel System provides a monitor, separate speakers and a tuner unit. What is more important, though, is that all this can be added to, or just one unit changed, as you would with audio. The tuner unit matches similar audio units (and presumably could sit with them). Later additions will be **Teletext** and **Prestel** decoders and presumably, when satellite direct broadcasting starts, a tuner and decoder for these too.

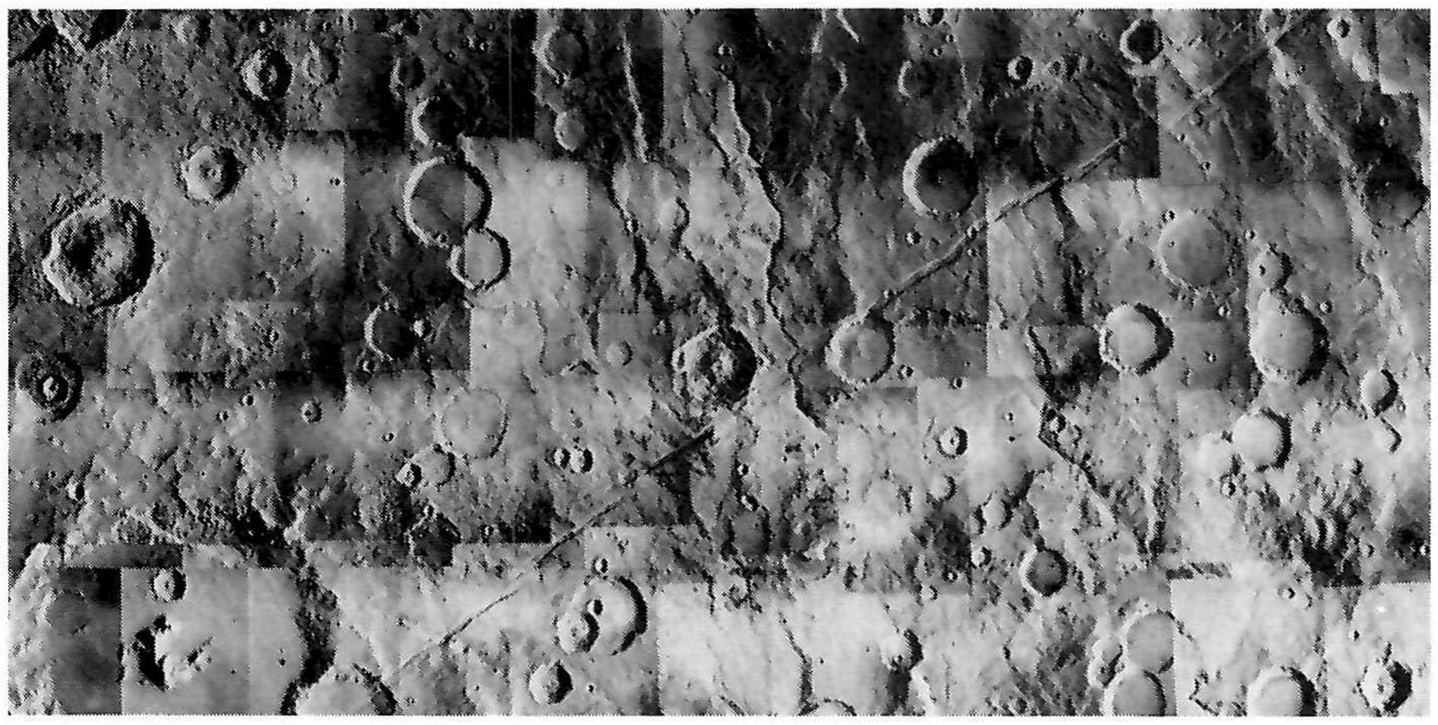
Stereo TV sound isn't available as yet (except as simultaneous broadcasts) but TV studios are quite capable of recording TV sound in stereo. When it does arrive, the Profeel System monitor is ready, complete with stereo amplifiers. Remember, TV sound is of an extremely high quality – just as good as

VHF radio – and it reaches your set this way; it's just that most TV receivers don't treat it very kindly in the set itself! Many video cassettes are also recorded with a stereo soundtrack, as are most video discs, so although the facility for playing them through an ordinary audio system is there, the Profeel allows you to play them through the set – in stereo.

NEXT ISSUE

CR ET HI Spielberg's captivating new blockbuster *25 years of the Space Age *Special 'TRON' four page pull-out *'Snowspeeder' model diorama *Patrick Moore explores the Moon *Blake's 7 Episode Guide – Part 2 *All the regular features. Plus! An exclusive interview with Arthur C Clarke *All this, and more, in the next issue!

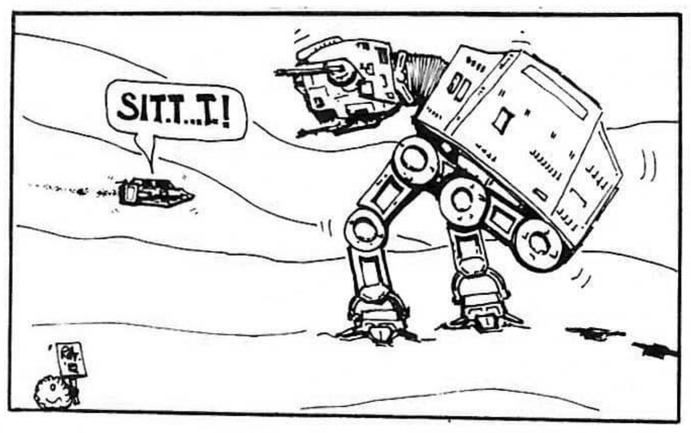
WINTER ISSUE ON SALE, DECEMBER 30

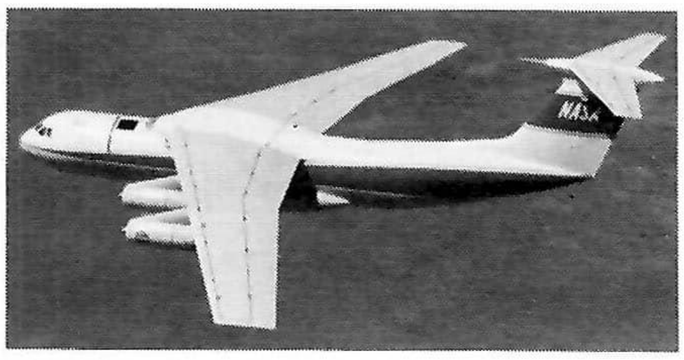


And still they come
More than 50 000 photographs of Mars have been taken by the Viking probes over a period from 1976 to 1980. Because of this high number only recently have they all been processed despite the Viking 2 Orbiter ceasing operations in July, 1978, and Orbiter 2 in August, 1980. The Viking 2 Lander was shut down in April, 1980, but Viking 1 amazingly continues to send back information, even in a reduced mode, four (Martian) years after it landed. As long as nothing vital actually fails, Viking 1 can continue functioning until December 5, 1994!

Even though the other three elements in the Viking mission are silent, the information they have sent back will keep the analysts busy for many years to come.

CARTOON BY
ROBIN HILL





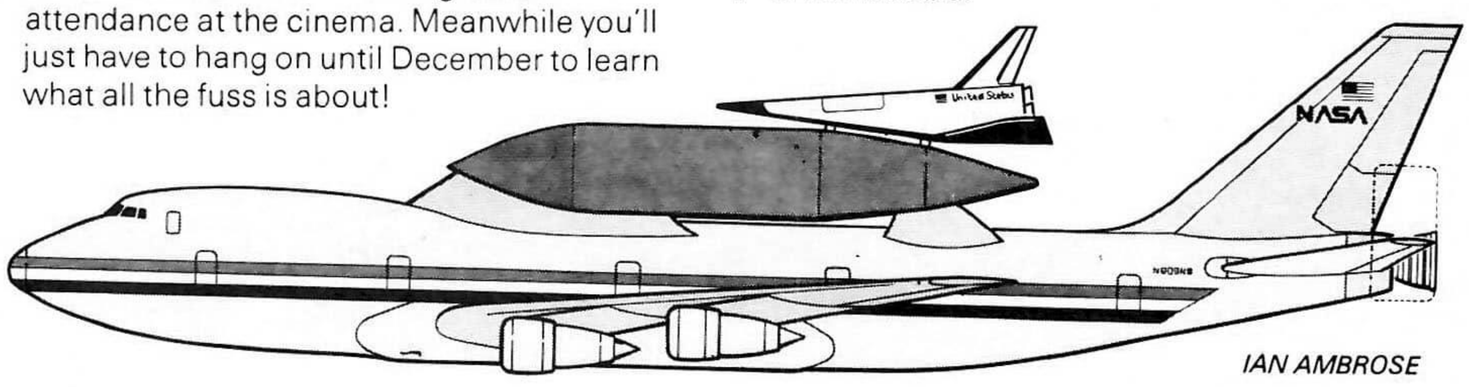
The flying telescope
NASA's Kuiper Airborne Observatory is a modified Lockheed C-141 Starlifter, with a 36 in. Cassegrain telescope on board, positioned just ahead of the wing. It has been used for many astronomical observations which are impossible for ground-based observers. It has also been used for somewhat non-astronomical tasks, such as viewing the underside of *Columbia* on re-entry to check the overall heating. On the last mission it failed in this task as something went wrong with the telescope's mechanics. However, NASA 714 – its official designation – has redeemed itself by a stint of valuable pure astronomy. Observers from Caltech, the University of Hawaii and our own UK Infrared Telescope Team have been looking at the Orion Nebula. In infrared it shows the different aspects that this familiar object takes on when viewed in a different wave-length. New stars visible only in infrared (they are 'only' 100 000 years old) are, at present, hidden by vast clouds of dust and gas. Many, in the eons to come, will become apparent in the normal wavelengths of visible light to produce an even more spectacular Orion Nebula.

Equality in orbit
All Astro/Cosmo/Euronauts to date have been men, with the notable exception of Valentina Tereshkova (above) who flew as long ago as 1963. NASA already have women training for the Shuttle programme and the Soviet Union is prepared to return the ladies to the cosmos with two female engineers being trained for future flights to *Salyut*. Last month, Svetlana Savitskaya joined the crew of *Salyut 7* in a much publicised docking.

Salyut 7
The Soviet Union has moved its manned space activity from *Salyut* 6 to the new *Salyut* 7, launched in April. The *Soyuz* T-5 crew of Anatoli Berezovoi and Valentin Lebedov docked with the Space Station on May 14, and they were joined a month later by the *Soyuz* T-6 crew of three, including the first Frenchman to fly into space. The Soviets have been launching 'guest' cosmonauts from other Eastern Bloc countries for some time, but this is the first time a westerner, other than an American, has flown. The French 'Euronaut' was Jean-Loup Chretien, who was launched with colleagues Vladimir Djanibekov and Alexander Iventchenkov on June 24. The launch was shown live on television, the first time since the launch of the Soviet half of the Apollo/*Soyuz* Test Project in 1975.

ET as it is writ
In a country where law suits are, seemingly, a growth area, recent reports relating to copyright infringement over Steven Spielberg's latest SF masterpiece will come as no surprise. Spielberg is being sued for $750 000 000 by Lisa Litchfield who claims her play *Lokey from Maldemar* has inspired the *ET* story. If reports from America are true, *ET* is based on 'dramatic sequences, characterisation, plot and subject matter' from her one-act stage musical. Following her play's first staging at Hollywood theatre four years ago she despatched the script to **Universal** who, it is alleged, rejected it. Her lawyer, Ralph Server, stated last month that the $1 000 000 a day that *ET* was taking belonged to his client. 'We're trying to set an example', he said. 'This infringement has got to stop.'

The consequences of this matter have yet to be resolved satisfactorily but, ironically, whatever the outcome all the extra publicity will doubtless reflect in even greater attendance at the cinema. Meanwhile you'll just have to hang on until December to learn what all the fuss is about!



IAN AMBROSE

ALSV
During the original Shuttle ALTs (Approach and Landing Tests) at least one television newsreader stated, 'this is how the shuttle will be launched into orbit' (*sic*). Now if Boeing and the USAF have their way this need not be so far from the truth, for they are studying plans for a small spacecraft to be carried aloft by a modified 747. The most startling feature, though, is in the 747 itself, for to put the giant aircraft into the correct trajectory to launch the craft, it has to climb at an angle of 55°. Consequently, the plans include installation of a single Shuttle Orbiter main engine (SSME) in the tail of the Jumbo. Fuel for this, and the small version of the External Tank, would be carried in well-insulated tanks in the main body of the aircraft. The little shuttlecraft itself would be powered by nine Pratt and Whitney RL-10 rocket engines.

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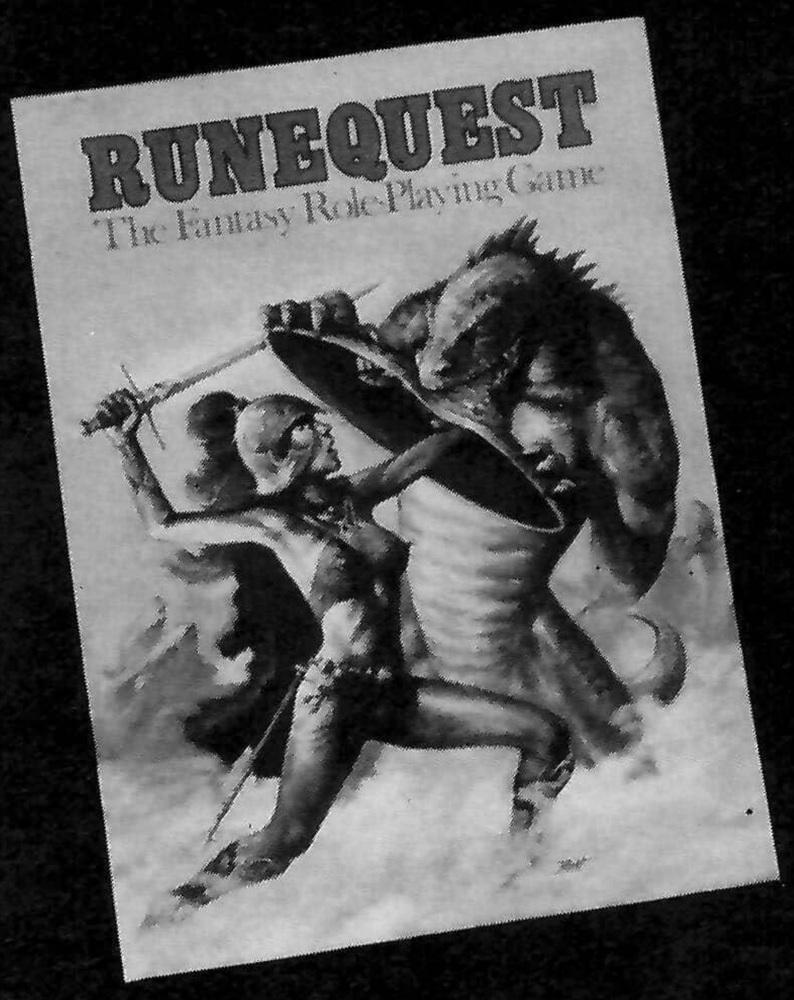

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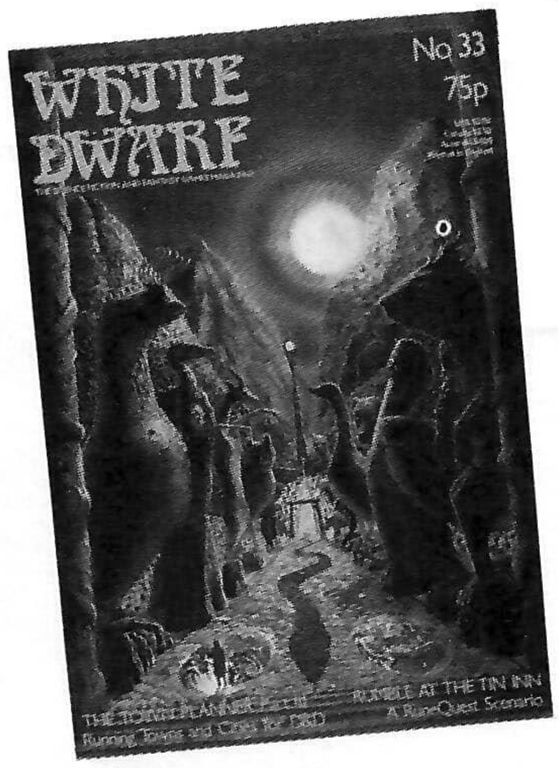

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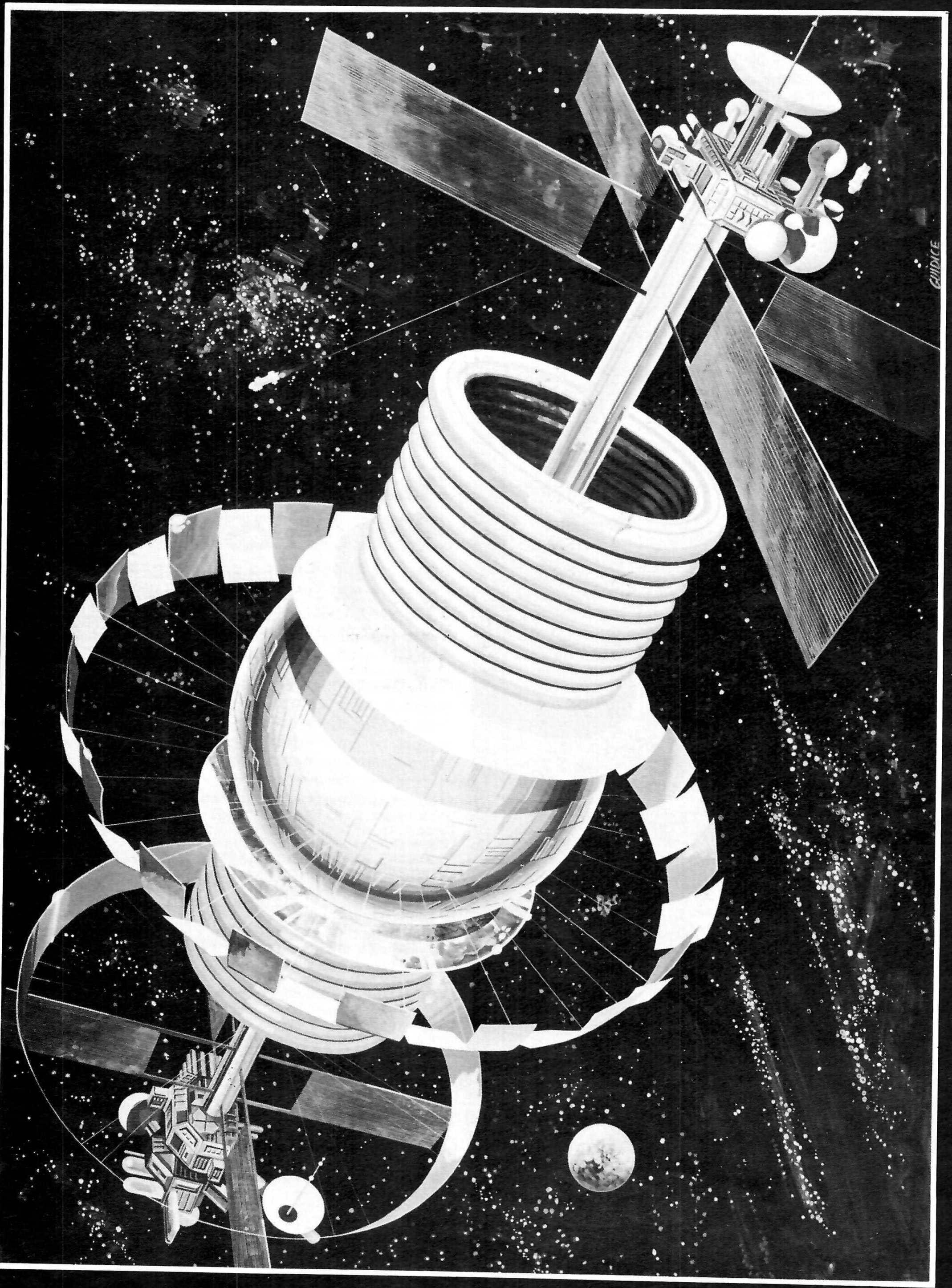

GUIDICE

IN SEARCH OF NEW WORLDS

By ALAN BOND BSc (Eng.) OF THE BRITISH INTERPLANETARY SOCIETY

A few moments' glance at a starlit night sky is a salutary reminder that the human race, with all its petty territorial problems, has not yet scratched the surface of the potential real estate of the galaxy. Unfortunately it is a fact, that on the scale of the galaxy, we humans are somewhat trivial, having diminutive proportions and a fleeting lifespan. At first sight, even to consider that we could cross, let alone occupy or extensively modify, the available surface area of the galaxy seems to require a species with the ego of Douglas Adams' character Zaphod Beeblebrox! However, it is the character of living organisms on Earth to relentlessly press for occupation of all available living space with the result that after 4·6 billion years they have now covered this planet and are trying to expand off its surface.

Is it therefore conceivable that we could indeed eventually fill the galaxy? From our astronomical observations it seems unlikely that anyone from other worlds has yet done so. This could indicate either that it is not feasible to do so, or that we on Earth are in the running to be the first to occupy the galaxy. Let us take the Beeblebrox view that the galaxy is here for us to occupy and see how it might be accomplished. We should first take a quick look at the task in hand.

A hitch hiker's guide

The Sun is a member of about 500 billion stars bound by their mutual gravitational attraction into the disc-like structure of the galaxy, slightly fattened at the centre. The Sun is presently located on the trailing edge of a spiral density wave (called an arm) at about 32 000 light years distant from the centre. The regions within about 8000 light years of the galactic centre are very densely packed with old red stars, the population II type, and the region is generally devoid of interstellar gas and dust. This structure is called the nucleus. There are, however, several high velocity gas clouds in, and adjacent to, the nucleus and it also contains, near the centre, a pair of massive, very bright, objects reminiscent of quasars. It seems to have undergone violent events in the past few million years. About 10% to 25% of the total mass of the galaxy is in the nucleus whilst the remainder is in the disc and halo. The disc contains both population II and the more predominant, and younger, population I type of stars which include the Sun. In photographs taken of other galaxies it looks as though the disc stars are in distinct spiral arms, of which, we believe, our galaxy has two. This is only apparent, however, due to the higher proportion of massive, hot young stars in these density waves (which are the birthplaces of new stars) and which, therefore, stand out on photographs. The galaxy has a diameter of about 100 000 light years, and near the Sun it is about 1500 light years thick. In our neighbourhood the spacing between stars is about four to five light years whilst they crowd together much more densely in the nucleus, being only fractions of a light year apart. Orbiting a few tens of thousand light years away from the main galactic body are about 110 globular star clusters, locally stable clouds of population II stars. Within a spherical volume around the galaxy about 100 000 light years across, are a large number of thinly-spread population II stars called halo stars. This thin halo and the globular clusters are very old.

The galaxy is probably between 10-12 billion years old, whilst the Sun is only 4·6 billion years old. The galaxy probably only contained isotopes of hydrogen and helium when it was first formed, but ancient stars synthesised all the heavier elements which now constitute most of our lives including ourselves, the planet we inhabit, and the materials we use in our technology. Stellar explosions and eruptions, presumably, were responsible for the distribution of the heavier elements through the galaxy. Between stars is the thin filling of interstellar gas and dust-grains, the weak, but important, galactic magnetic field and the cosmic ray particle flux.

Models of stellar formation for population I type stars indicate that planetary systems having the general character of the solar system will be common. Simulation of the process using a computer suggests that there may be several tens of millions of solar-type stars with rocky terrestrial planets at a distance which, with some intervention of technology, could support terrestrial life. These solar systems also contain Jovian-type gas giants.

This, then, is the broad-brush outline of the place we wish to colonise, a vast and inhospitable expanse between potentially habitable planetary systems around stars; systems which will require, nonetheless, a lot of effort in transformation before man could walk on their surfaces.

Transport

Our galaxy is so vast that even light takes years to traverse between stars. Human beings have a short lifespan and therefore two extreme options appear to exist if we wish to send man on such vast journeys. First we might try to design very energetic starships capable of approaching close to the speed of light. In such vessels, relativity predicts that dynamical systems slow down relative to unaccelerated systems left behind. This includes the metabolism of the crew and so if a vehicle could travel fast enough the astronauts could travel across the entire Galaxy in their lifetimes. The people on Earth, however, would still see missions taking thousands of years to complete. Although there are a number of ideas as to how such vehicles may eventually be constructed, none is feasible at present and in view of the long transit times from Earth's reference frame one might question the value of such craft.

The second option is to accept the scale of our galaxy and the fact that it will take thousands of years to make a transit and to design our starships accordingly. Such vessels would be enormous, would carry a very large complement of people and travel quite slowly by 'normal' standards when discussing interstellar mission velocities, say, up to 1% of lightspeed. The people aboard would live their lives out during the transit and would leave their progeny to carry on for many generations. This latter option may seem repugnant, and yet it could be the most practical way for the human race to colonise the galaxy.

In view of the more imminent feasibility of this approach several people have considered the design of such vehicles over the past few years.

Worldships

A common conception of an idyllic life is that portrayed by the populations in certain archipelagos, such as those of Greece and Oceania. In times past, these island groups have sustained sizeable communities in a state of social and economic existence regarded by many as near perfect. The climate was regular and generally benign. Flora and fauna lived in a well adjusted balance with the human community and communications between islands was made relatively easy by sea voyages.

Such communities were totally unaware that they were in orbit around a star, it's only practical value a source of light and heat (for which it was respected), or that they were making a steady transit amongst the stars of our galaxy.

Let us suppose that with the aid of 27th Century technology we could construct vessels of huge dimensions and furnish them as small states, with grass, trees, rabbits, birds, 'daylight' which cycled daily, lakes, streams, roads,

Not a worldship, but a Bernel Sphere Space Colony. Central living area is a mile in circumference, the ribbed rings contain the agricultural areas while the radiator panels are attached to the despun docking and industrial areas located at either end of the colony. Photo: NASA

houses, gardens and people. If we also assume that a number of such vessels could be launched as a flotilla onto an eccentric trajectory through the galaxy we could simulate, quite accurately, the polynesian island situation with the extra quality of destiny. At some time in the future they would know that they were to encounter a star having a good chance of reprovisioning their fleet and which they could, if they could find volunteers to remain on a natural, wild world, colonise. This destiny of founding a new world would be the underlying reason for their existence. Even so, the immediate object would be simply to live their everyday lives much as humans have ever done. There need be no apparent difference in their way of life to that which we live today (2650 AD). Indeed, if part of the objective is not only to spread human beings through the galaxy, but culture as well, then it is important that the way of life on such a 'worldship' should be compromised, relative to that on the worlds of the solar system, as little as possible.

Clearly we are unable to say much about motives for people wanting to travel in this way to the stars but such a world as that outlined does not seem in the slightest repugnant to the writer, and indeed, compared to many aspects of life on Earth, could be definitely attractive. Several people have discussed the size and population of interstellar vehicles. A summary of these is given in **Table 1.**

During 1979, Dr. Tony Martin and the writer began to consider, in the light of what had been learned in the Daedalus Study, the design of such worldships. Our view was that colonisation would be a task for a human population of several tens of millions of people, rather than the few hundreds usually considered, and that if a single ship were to function as a self sufficient 'island' population, it would need to carry some 250 000 people at least. We began to assess, therefore, the largest ship that it may be possible to build. It became apparent quite early that Arthur Clarke had already come quite close to the ideal concept in his novel *Rendezvous with Rama,* in which a large cylindrical alien ship entered the solar system. Based on a population density of 100 persons per square km a cylindrical vessel, some 16 km diameter and 50 km long made from Maraging steel, looked like a very good basis for the 'world'. The vessel would rotate about once every three minutes about its axis, producing artificial gravity on the interior and hence transforming the inside surface into the surface of the world. The calculations of stresses and the instabilities in a rotating cylinder have been extended and it now seems that a single worldship might have a habitat about 20 km diameter by 115 km long with a surface area of 7000 km^2. This is comparable to Crete, the home of the Minoan Civilisation. The population it could support at 100 per km^2 would be 700 000. The population density of several nations is given in **Table 2** for comparison. The material selected for the vessel is Maraging steel, since this is potentially widely available from asteroid mining and it has a good tolerance to defects. It also has high strength which is necessary to support the centifrugal 'gravity' loads and the internal pressure of the atmosphere. The wall would be 5·75 metres thick and would carry a five metre deep topsoil inside. The mass of the vessel would be over 500 000 million tonnes.

If these vehicles were launched in fleets of 30 to 40 they would carry 20 to 30 million people, the size of a typical European nation. It is assumed that this is at least of the correct order of population required to modify and colonise a new world, given adequate technology and energy with which to do it.

The desirable environment inside a worldship is given in **Table 3.** A particular difficulty is overheating due to illumination source. If light having the same spectrum as the Sun were used, it would quickly cook the occupants unless a very powerful cooling system was employed. It seems likely, therefore, that the illumination would have to be provided using lights having a sharp cut-off outside the visible region of the spectrum.

The wall temperature of the worldship would fall to about −150°C on the outside during the flight between the stars. Another problem is that of air leakage. It is possible that flights between stars will take several thousand years and during that time, especially if regular travel between worldships occurs, there will be unavoidable loss of atmosphere. This would have to be limited to about 100 000 tonnes of air lost per year if the weight penalty is not to be excessive.

If regular shuttle flights between worldships are to take place they would ideally use a form of propulsion which did not expend a great deal of mass. This would otherwise be as severe a penalty when totalled over several thousand years.

Since a sizeable number of individual vessels would be present, it would be possible to preserve a range of environments and culture within the fleet. Exchange of social, economic and cultural activity would therefore be possible on a regular basis.

An engine to drive a world

Clearly, an engine capable of driving a small world, having a mass of 500 billion tonnes, to another star, would be very powerful. The only way known by which it could be done is by use of a nuclear pulse rocket. *Project Daedalus,* described in *Space VOYAGER,* was a study of a nuclear pulse rocket for an unmanned, one-way, interstellar mission. Powerful though that rocket would be, it would release only one millionth of the power of a worldship engine. The nuclear pulse rocket involves the simple concept of triggering a train of nuclear explosions behind the vehicle and literally blowing it along with the expanding debris.

For a worldship it is proposed to use the deuterium-burning nuclear fusion reaction as used in some weapon tests. Since the explosions would occur some 30 km, or more, from the vehicle the hull and engine hardware would reduce radiation levels inside to a minimal value. The explosions would be timed to occur several seconds to a minute apart and would use 250 tonnes of deuterium each. Surrounding the deuterium of each pulse unit would be some 7500 tonnes of hydrogen to act as a propellant to be driven by the explosion of the deuterium. In all the propellant for the worldship would weigh 2·2 million million tonnes and its storage tankage would double the vehicle length to about 250 km overall at the launch time. During the boost period each detonation would be a stupendous explosion equivalent to 4000 million tonnes of TNT. The vehicle would have a pusher plate attached to it protected by a magnetic field. The expanding plasma from the explosions would impart a force to this and then to the vehicle. Such explosions would produce only the mildest acceleration of the worldship, quite unsensed by the population. It would take perhaps 10 to 100 years to accelerate these ponderous vehicles up to 0·1 to 1% of light speed, at which time they would then go into their long interstellar coast. We may be talking of 1000 years to coast between the closer stars and more probably 10 000 years or more to pass between stars having acceptable planets for colonisation.

The pulse explosions for a worldship could not be triggered using fission devices as are

Table 1. Some proposed worldships

Originator	Vehicle Mass (tonnes)	Population	Flight Duration (years)
R H Goddard (1918)	?	?	10 000-1 000 000
J D Bernal (1929)	?(10 mile sphere)	20 000-30 000	~ millenia
J G Strong (1965)	10^8	10-150	~ 100
F J Dyson (1968)	4×10^5	200	~ 100
F J Dyson (1968)	4×10^7	20 000	~ 1000
R D Enzmann (1973)	$1{\cdot}2 \times 10^7$	2000	~ 100
G L Matloff (O'Neill) (1976)	$6{\cdot}5 \times 10^5$	10 000	~ 1000
G L Matloff (O'Neill) (1977)	2×10^4	1000	~ 200
M G de San (1978)	2×10^{10}	1 000 000	~ millenia
A R Martin, A Bond (1980)	7×10^{11}	250 000	~ millenia

Table 2. Population densities on Earth (c.1980)

Country	Population Density (km^2)
Netherlands	319
Japan	281
United Kingdom	241
France	90
USA	22
USSR	11
Australia	2

Table 3. World ship environment specification

Duration field	10 m sec^{-2}
Atmospheric pressure (O_2, N_2)	10^5 N m^{-2}
Ambient temperature	290°K
Cosmic ray background dose rate	< 100 mrem/year
Interior regolith density	2500 kgm m^{-2}
Interior regolith depth	5 m
Illumination	10^5 Lux, daily and seasonally varied and corrected for latitude desired.

thermonuclear weapons today. This would demand too much use of valuable uranium or plutonium. A non-nuclear trigger would be required. It is proposed that this could be achieved by the use of a metal piston, possibly aluminium, driven into the deuterium at about 1000 km/sec. This piston would be accelerated using a travelling magnetic wave similar to the linear motor system. The accelerator would need to be long, with present day technology, about 20 km, but this is not an embarrassment on a vehicle of this scale. The pulse unit itself would have the hydrogen mantle flattened along the ship's axis so that when it exploded, the propellant would mainly be confined to expanding axially rather than radially, thereby increasing the efficiency of the system. A small hole through the hydrogen mantle down to the deuterium core would admit the high velocity piston to trigger the detonation.

All propellant for worldships must be taken from the Jovian planets. Assuming that deuterium is the fuel and hydrogen is the propellant there is more than sufficient material in Jupiter's atmosphere alone. The main limitation will be structural steel and an approximate estimate suggests that the asteroid belt could furnish sufficient materials for over 100 000 worldships the size discussed here. Jupiter would not even notice the loss of the trivial 200 000 million million tonnes of propellants required to drive these!

Perspective

It is probably about 10 000 years since mankind first realised that he could grow his food under his own control, and keep animals under his control instead of having to chase them at meal times. A simple economic growth calculation suggests that worldships may be feasible sometime in the 27th century. Assuming that the next extrasolar planet the human race will colonise is within 50 light years of the Sun, and that we can reach 0·5% lightspeed, about 10 000 years from now we will be making our first mark on the galaxy. Of course, it is quite a demand to build an engineering structure to last 10 000 years. However, the pyramids are half that age and had they been essential to human survival they would probably have been maintained to be as imposing now as when they were first built. A worldship will be essentially a passive structure in a very stable environment and should last at least as well as the pyramids.

Galactic man

In human terms it will take a long while for man to spread across the galaxy. We can assume that each 'hop' to a stellar neighbour will take 10 000 years and that a few thousand years will then pass in beating the new stellar system into submission. At some stage, presumably, the new colony will itself begin colonisation, building its own worldships using fuel from the gas giant that their system will contain and expanding its frontiers. We can envisage, therefore, a kind of colony front expanding from the Sun, initially roughly spherical, travelling at perhaps 0·1% of lightspeed. In the direction of the galactic poles, the galaxy is only 1500 light years thick near the Sun and we are near the midplane. So after about 750 000 years the expansion away from the plane will cease and the expansion will then be cylindrical in the galactic disc, until the outer rim of the galaxy is reached and then the outer edge of the nucleus. These will take about 17 000 000 and 23 000 000 years respectively. Finally, two fronts will advance around the galactic disc to meet on the opposite side to the Sun after about 100 000 000 years. It should be remembered that the galaxy is in a state of rotation and this will modify slightly the above scenario, but it should be approximately correct.

It would appear, therefore, that on a timescale which is of the order of the age of the mammalian line since its origin at the dawn of the tertiary period, the life which began on Earth will have covered the galaxy. This is, as an astronomical or geological timescale, quite short and there seems little to prevent its occurrence. The conflicts for territory which are forced to occur on the colony front will undoubtedly make *Star Wars* seem tame when one considers the power that worldships would be able to command for destruction if they wished. In particular, the reflected colony waves from the galactic edge and nucleus, and the meeting of the two wavefronts on the opposite side of the galaxy, should result in territorial disputes on a scale beyond imagination.

For worldships of the size described here, and particularly if they fly in flotillas, the size of breeding population involved would be sufficient to reduce the effects of genetic drift to a negligible level. In other words, the men who will meet on the opposite side of the galaxy would be almost identical to man today. Of course, this assumes that man himself does not choose to intervene in his own genetic specification, or decide to abdicate in favour of his intelligent machines. I would take no odds on either of the latter possibilities, but if man does decide to keep the reins, he appears to be able to at least fill the galaxy with his descendants. *

FIGURE 1

COLONISATION OF OUR GALAXY MAY LOOK SOMETHING LIKE THIS CONTOUR PLOT SHOWING ISOCHRONAL BOUNDARIES OF HUMAN POPULATION

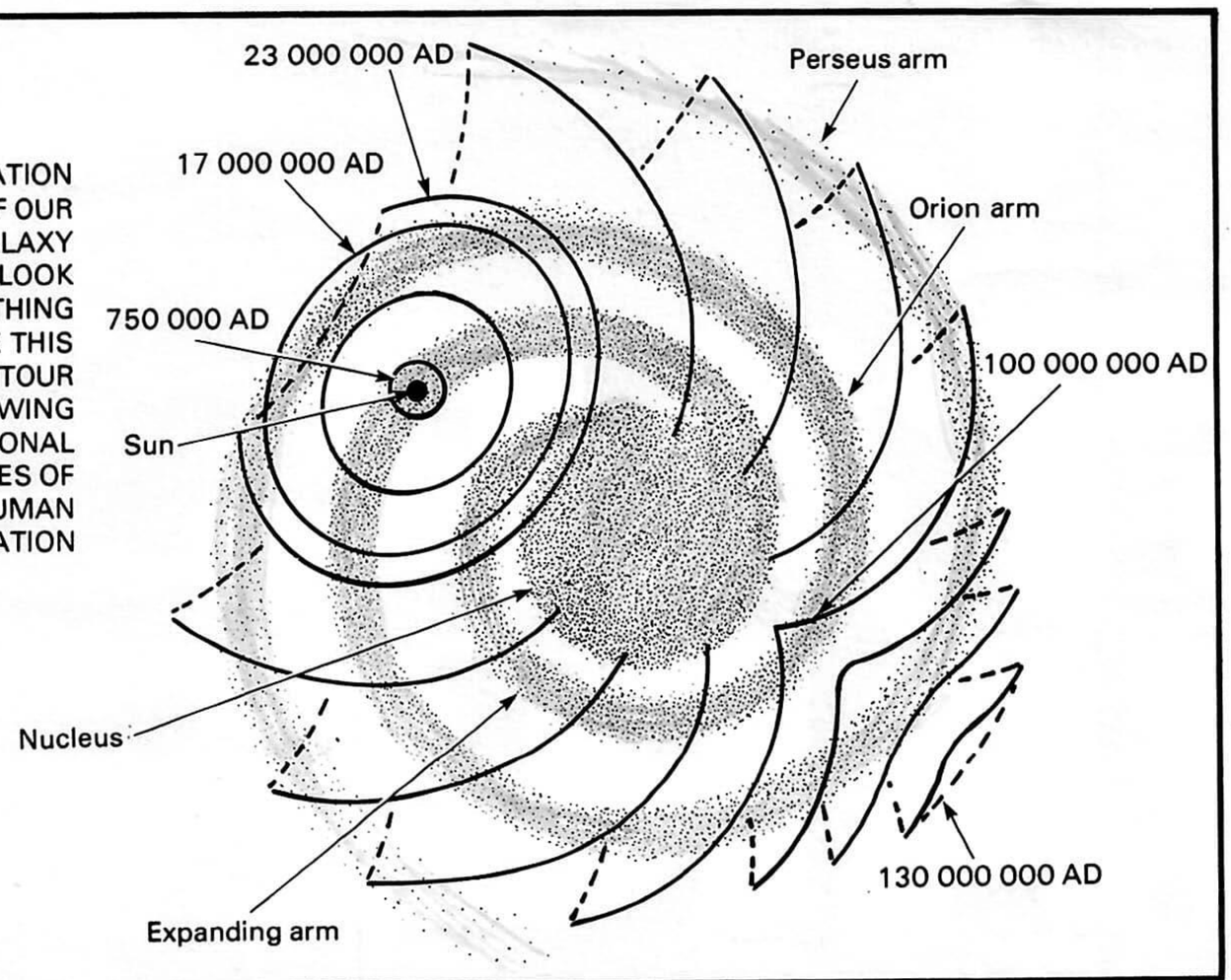
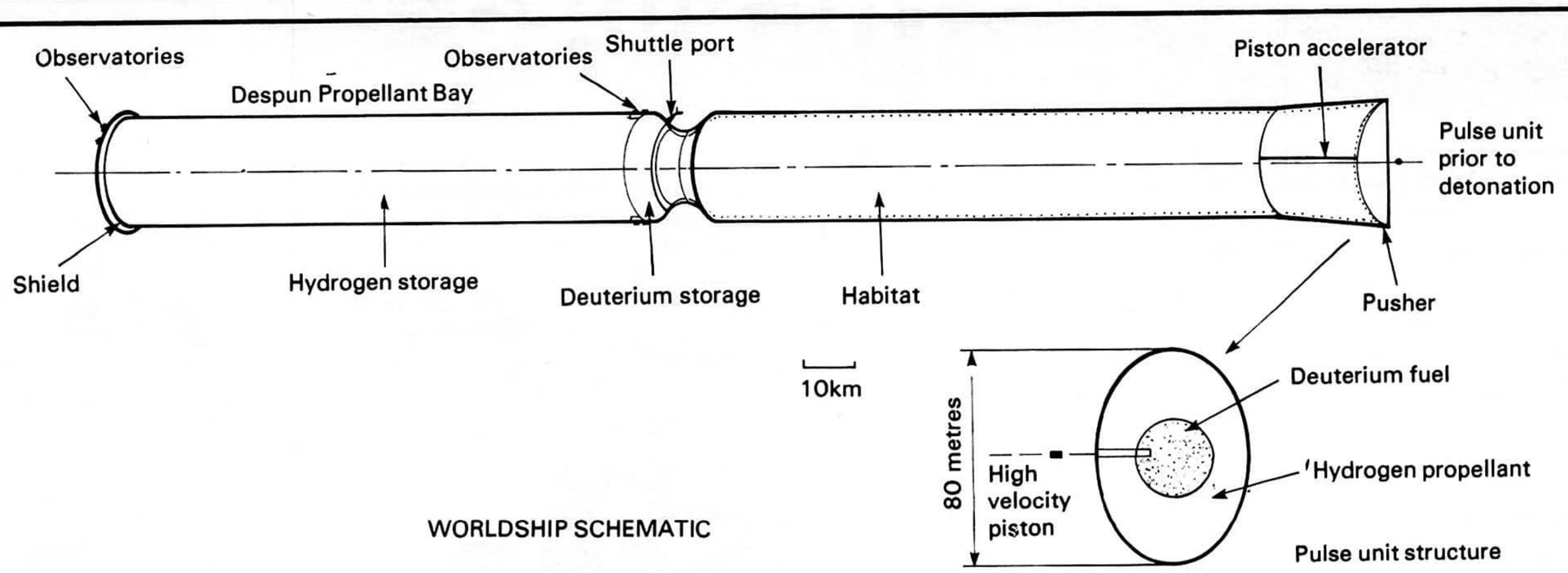


FIGURE 2



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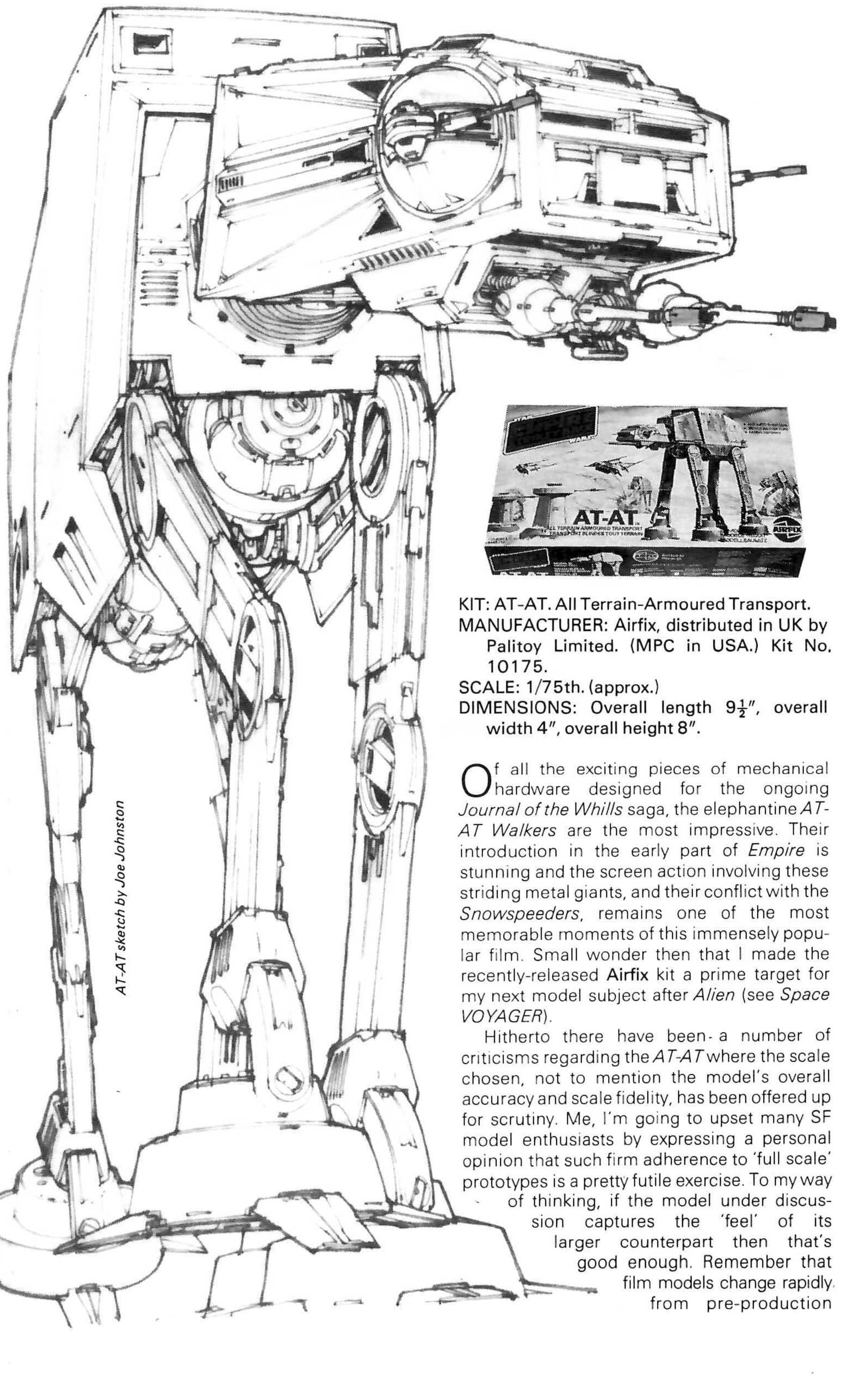
AT-AT

BUILDING THE AIRFIX IMPERIAL WALKER FROM 'THE EMPIRE STRIKES BACK'.
MODEL PROJECT BY RAY RIMELL



AT-AT sketch by Joe Johnston

KIT: AT-AT. All Terrain-Armoured Transport.
MANUFACTURER: Airfix, distributed in UK by Palitoy Limited. (MPC in USA.) Kit No. 10175.
SCALE: 1/75th. (approx.)
DIMENSIONS: Overall length 9½", overall width 4", overall height 8".

Of all the exciting pieces of mechanical hardware designed for the ongoing *Journal of the Whills* saga, the elephantine *AT-AT Walkers* are the most impressive. Their introduction in the early part of *Empire* is stunning and the screen action involving these striding metal giants, and their conflict with the *Snowspeeders*, remains one of the most memorable moments of this immensely popular film. Small wonder then that I made the recently-released **Airfix** kit a prime target for my next model subject after *Alien* (see *Space VOYAGER*).

Hitherto there have been a number of criticisms regarding the *AT-AT* where the scale chosen, not to mention the model's overall accuracy and scale fidelity, has been offered up for scrutiny. Me, I'm going to upset many SF model enthusiasts by expressing a personal opinion that such firm adherence to 'full scale' prototypes is a pretty futile exercise. To my way of thinking, if the model under discussion captures the 'feel' of its larger counterpart then that's good enough. Remember that film models change rapidly from pre-production sketches to first prototype – indeed, often from first prototype to completed SFX model. This occurs not only during production but often during the completed film as well. Fret over a minor scale discrepancy? Worry about that odd misplaced panel line? No, avid reader, not me . . . My own personal – and I stress, it *is* personal – criterion when building any SF film model is an endeavour to reproduce 'stills' from the film itself. By that I mean using the model as a basis and enlarging the theme with careful photography and 'SFX' to reproduce an action scene as closely as possible.

If you're still with me let's now concentrate on the matter in hand (no, I'd not forgotten), the kit version of the *AT-AT*. I hardly need bore you by relating that it contains some 80 parts, is moulded in grey plastic and provides a rubber band for motivating the head, now do I? All these aspects, and others, are more than covered by Mat Irvine in this issue's **Products** column and require no repetition here. My own feeling is that the *AT-AT* kit matches photos of the actual SFX models far better than previous MPC/Airfix offerings.

1. Presuming you wish to light up your *AT-AT* (as I did) the forward viewing slit must be removed by careful cutting. Using a *sharp* craft knife, score round the inside edges of the moulded aperture until the centre can be punched out. Clean up all edges with a file. For the 'window' use some scrap red transparent plastic runner (sprue) cut, filed to shape, and glued into place. When dry it can be filed flush with the grey plastic and carefully masked off with **Sellotape** whilst other work is carried out. In this picture, *Stage 3* of the kit instructions has been completed.

2. 'Grain of Wheat' bulbs (you'll really need two) came from Airfix/MPC's *Falcon* but most model railway shops will stock them and they're quite cheap to buy. A suitable holder was made out of an Airfix/MPC *X-Wing* nozzle but a lump of **Plasticine** is just as effective in keeping the lamps apart as shown. The nozzle was a force-fit over the 'tunnel' of the head's rear, *part 10* (seen fixed here), and the wire passed through its aperture. The band and retainers for the 'moving' head were not used on my model. Note here, that kitchen foil has been used to line the interior of the head. The foil not only serves as a good reflector but prevents the heat from the bulbs distorting any plastic in close proximity.

3. This photo shows the head modifications more clearly with the 'lamp unit' in position and a battery on hand to check if the connections work. The kitchen foil was attached using strips of double-sided tape (try **Halfords** or **Woolworths**) and is much less messy than trying to use glue, even if you could find an adhesive that stuck foil satisfactorily, and cleanly, to plastic.

4. The rear of the head was detailed with odd scraps of plastic to make it more interesting and the slot, seen here, was filled with a strip of transparent green plastic. Not strictly accurate, but the light shining through gives a faint illumination to the Walker's forelegs and looks quite eerie in the dark! The wires will easily pass through the 'neck' (seen joined here) and I drilled a hole in the centre of the body underplate (*part 21*) so that the wires could pass through there and, later, down one of the front legs.

5. The underplate and leg mounts are shown assembled at slight variance with the instruction sheet sequence. One major, noticeable,

fault – and therefore requiring correction – concerns the legs which are set too close together. One effective remedy is to add plastic 'washers' (I used more *X-Wing* parts, I'm afraid) to pack out the mounting locations. These are arrowed on the photograph and should be *firmly* cemented with polystyrene glue. Alternatively, use scraps of odd plastic cut to shape.

6. The four legs should be assembled together at the desired pose. Only *two* legs are animated by MPC so that they can bend at 'knee' and 'ankle' joints. Since all the legs were to be glued together for my model, this rather lame attitude by the manufacturer did not bother me a great deal. Use tape to hold parts together while the cement sets and select one of the *rigid* legs to run out the lighting wires as shown below.

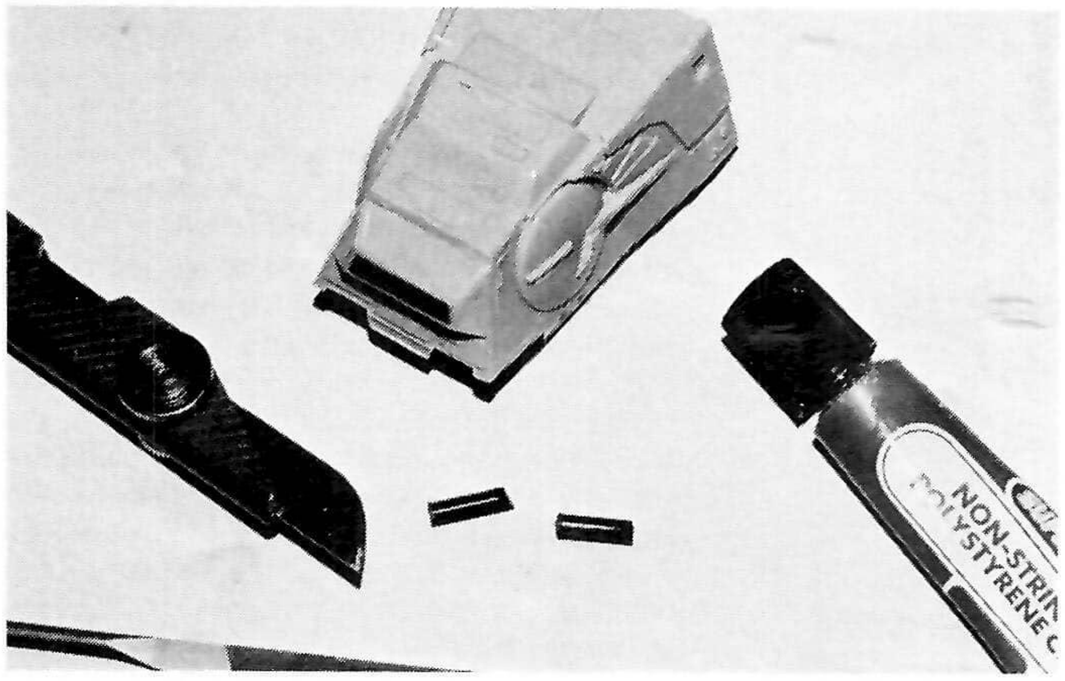
7. Drill close to the leg support lug and run the wires out and down the leg where they can exit the model on the hole on the leg's inner side. This hole may need enlarging for the wire to be pushed through more easily. Note that the holes at the top of each leg (inner halves only) may also need to be enlarged to fit over the packing 'washers'. In any case, sufficient plastic needs to be removed to allow easy passage of the wires. Tape the wires together at intervals, as shown, for neatness.

8. The two wires enter the 'foot' in lieu of one of the inner support braces (*part 49* – four off) and won't appear too obvious under a coat of paint. You could, of course, sheath them in a fine metal tube if you're that fussy. Drill two holes in the footplate and push the wires out before cementing the plate into place. Then the wires are bared and bent over so that they lie flat in the recesses of the 'toes'. Later, brass strips are laid over them and secured with double-sided tape to act as contacts (See **Figure 1**.)

9. For further effect I filed out the gun barrels of the bigger laser cannons and inserted a fibre optic strand into each one. Using a fine drill make an exit hole in the inner mating face of each gun and a corresponding hole in the side of the head. The optics are then worked through as near to the two internal bulbs as you can manage. When the contacts are powered, the barrel ends *should* light up. (See **Figure 2**.)

The smaller guns will be more difficult to handle for the barrels are rather too fine to drill out. You could just use the optic strand neat and paint, but I sheathed mine in fine copper tubing to keep them straight.

10. Underside of the head shown with gun barrels in place prior to spraying overall with car cellulose grey primer for a finishing coat.



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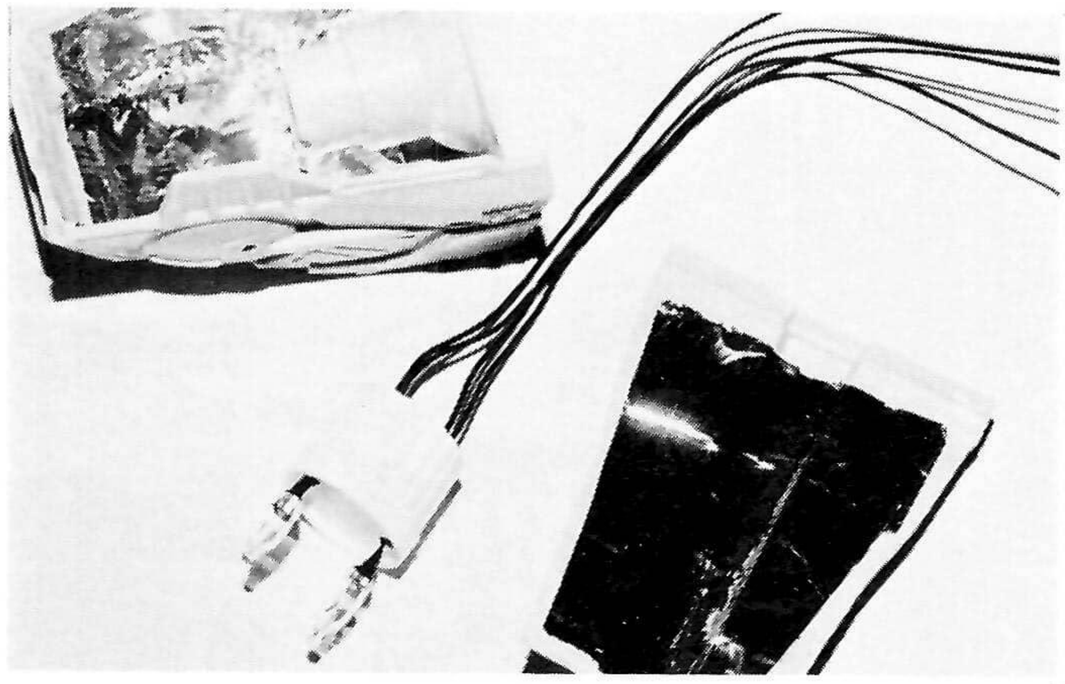

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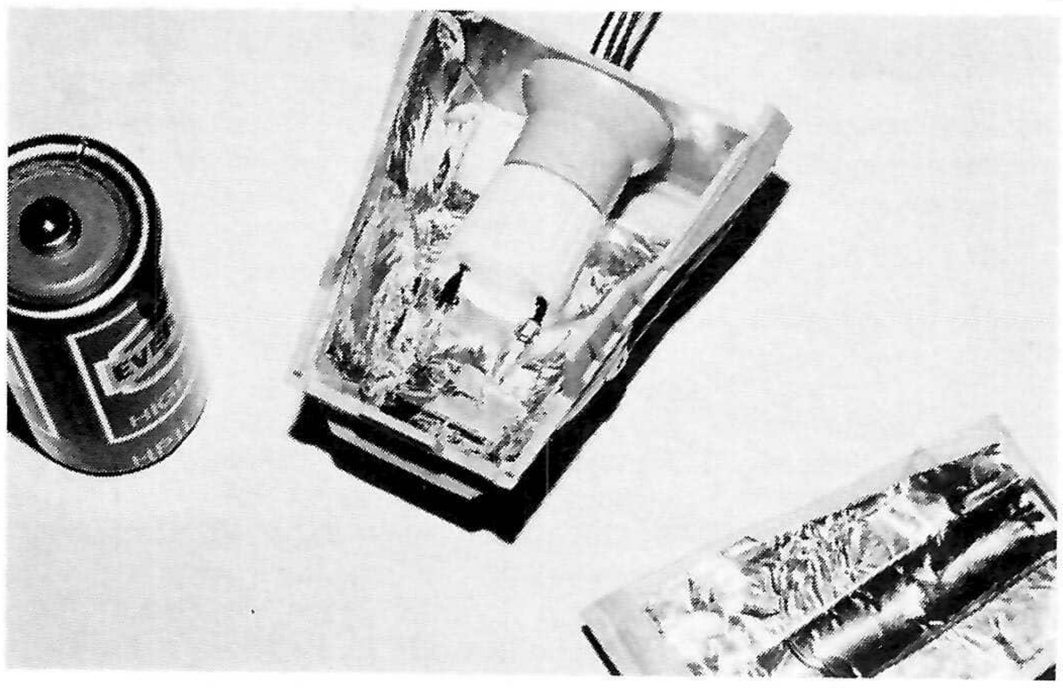

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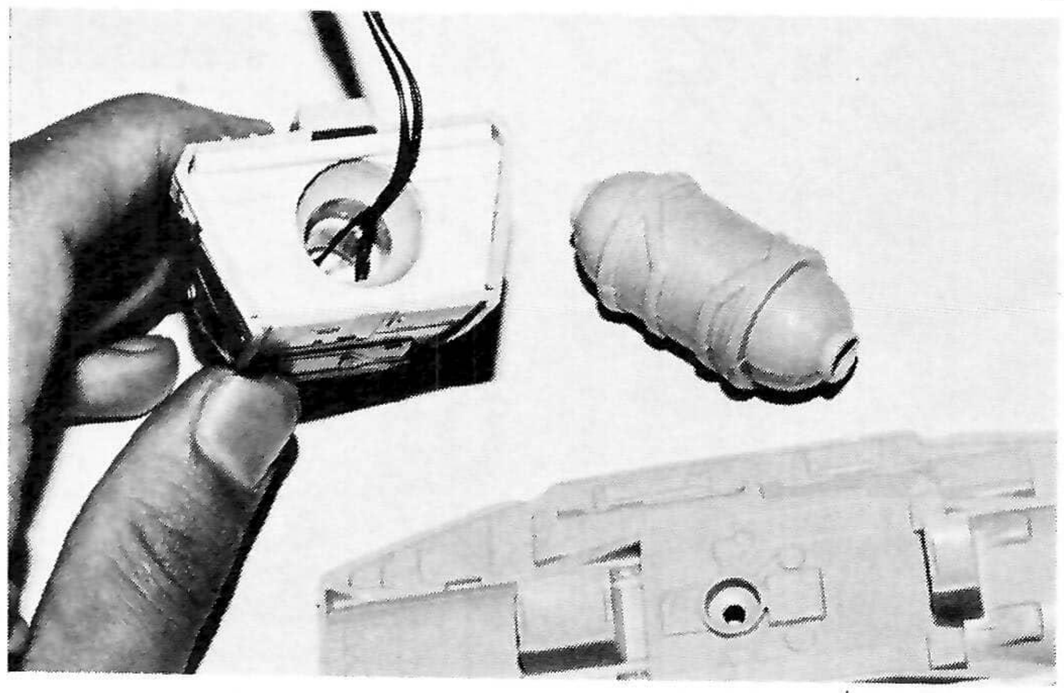

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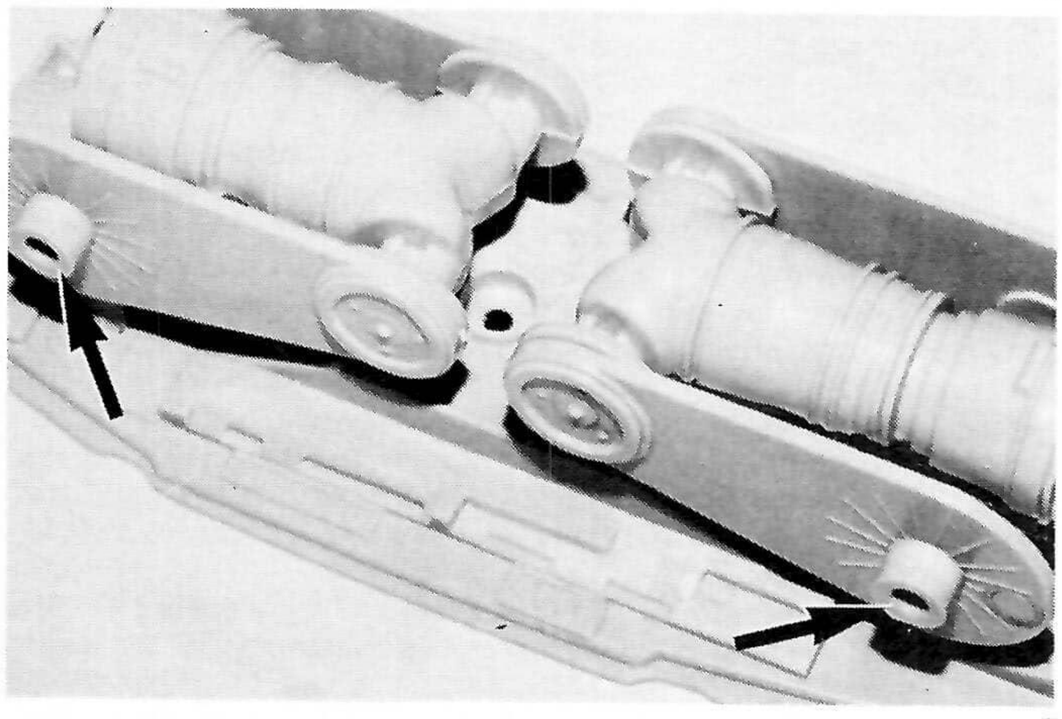

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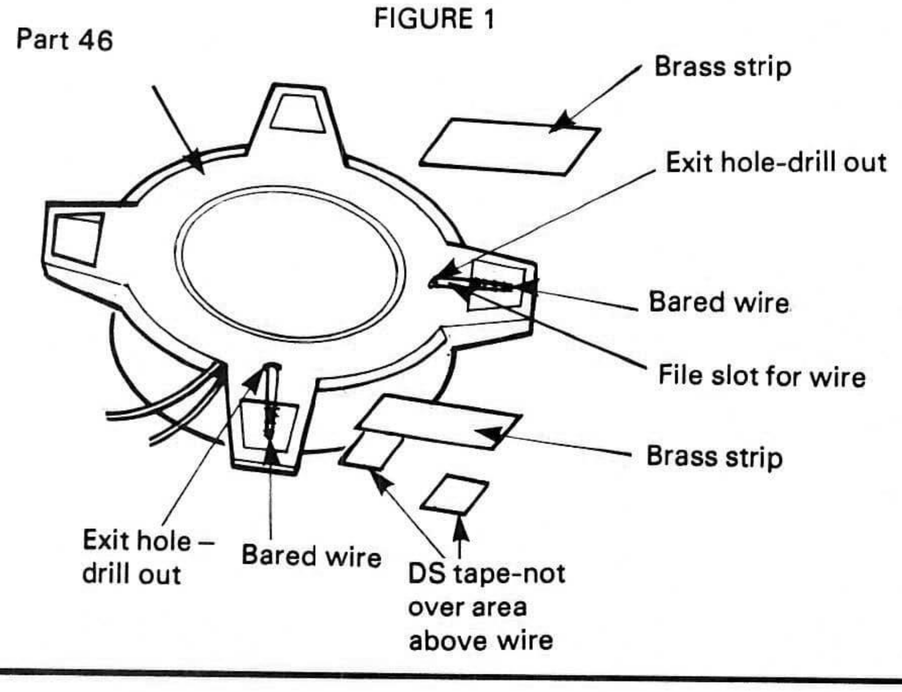
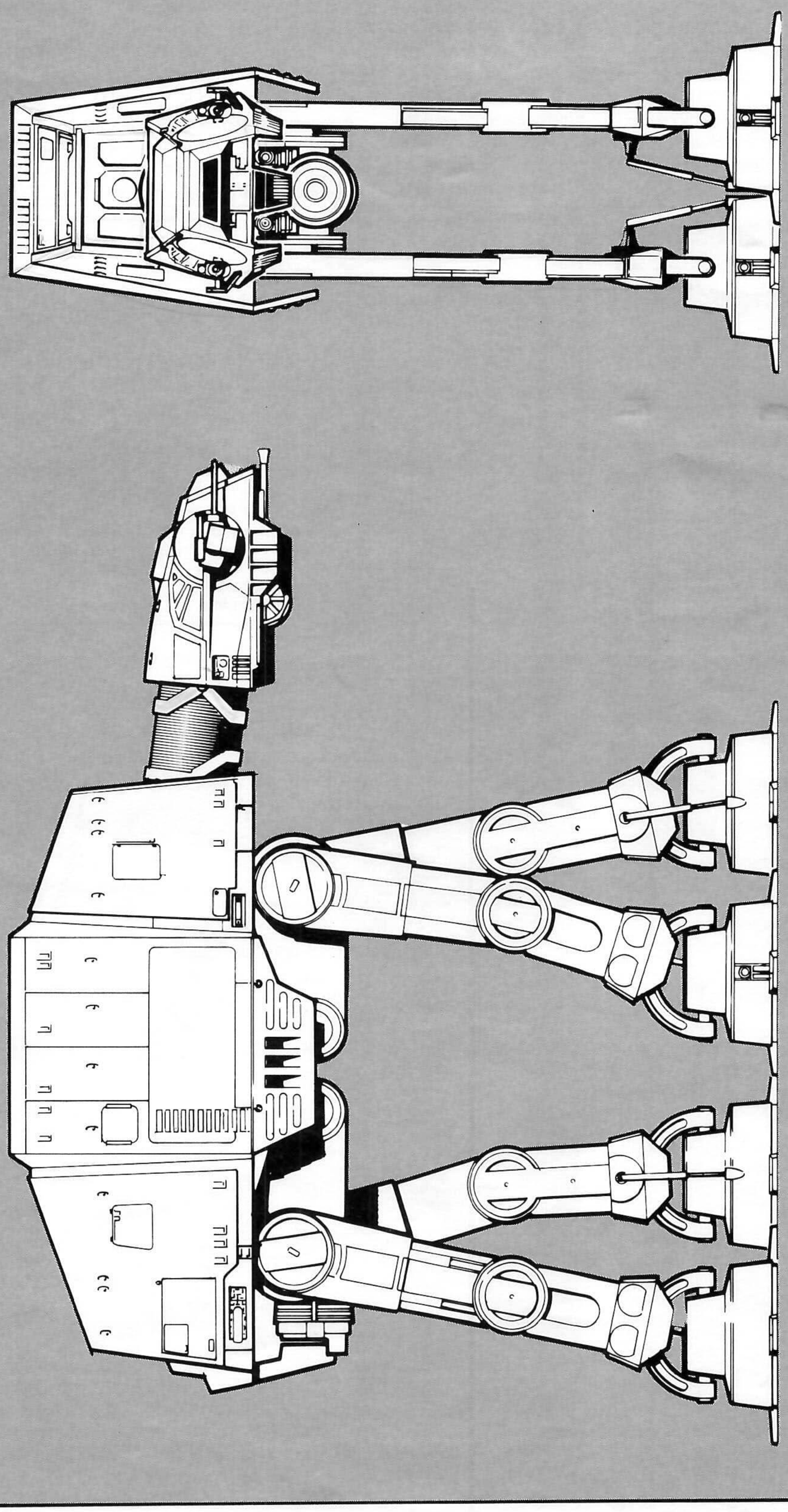
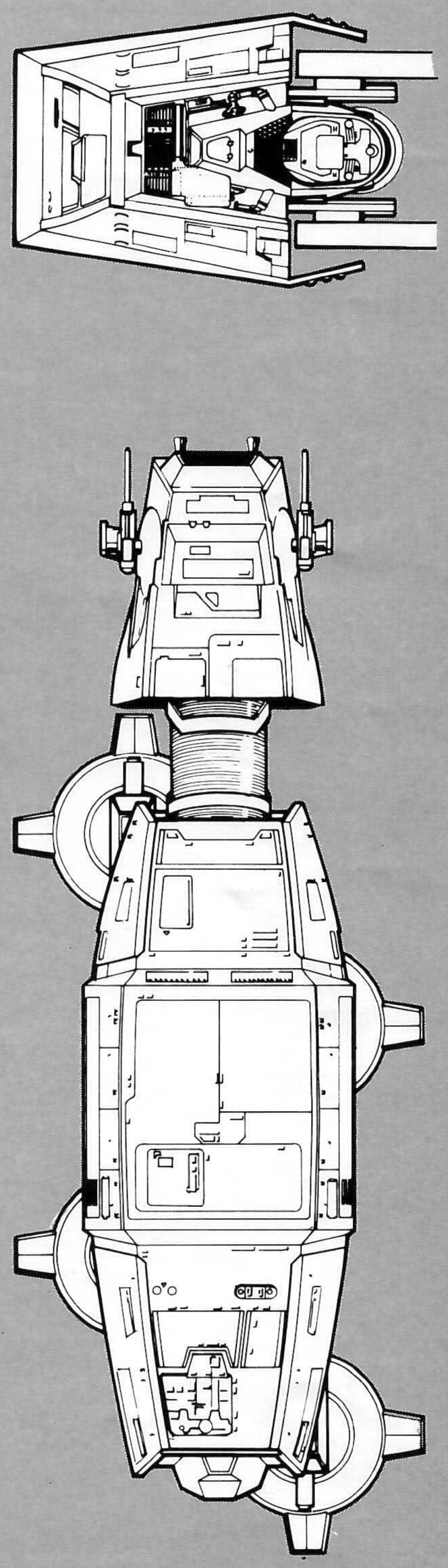
FIGURE 1



ALL TERRAIN-ARMOURED TRANSPORT

DRAWINGS BY IAN AMBROSE, BASED ON MODIFIED AIRFIX KIT





The model should have been fully assembled at this stage, all joints eradicated and filler, if needed, smoothed down to hide any gaps.

Several coats of aerosol matt grey should be applied but make sure the area you're working in is well ventilated – or better still do all the spraying work *outside*.

Weathering was achieved by using a coloured chalk (sold as boxes of pastels in most art shops) applied with a stiff brush. The technique is simple enough. Get hold of a sheet of sandpaper and select black, umber and dark blue chalks. Rub them over the paper to achieve little piles of coloured powder. Dab your brush into one colour, say umber, and stipple onto the top of the body then stroke the brush downwards. With practice you can achieve subtle streaks and stains that even an airbrush would have trouble in emulating.

For our *Walker* we used all the colours mentioned here with some white and light blue around the feet. Surprisingly, the more unlikely the colour, the better the overall effect. The only trouble with working pastels is that the dust is not permanent so has to be fixed with a spray coat of matt varnish but if you don't intend to handle your model much, spraying may not be necessary.

So now the model was complete and I sought a means of photographically reproducing the *AT-AT* attack in *Empire.* Our Art Editor, Steve Archibald, painted the special background of 'Hoth' whilst I knocked up a smaller *AT-AT* (from the 'Battle on Hoth' diorama kit) and one of the *Snowspeeders* in the *AT-AT* kit proper. All these items were brought together in *New VOYAGER*'s photographic studio where, after much careful positioning, the models were photographed. Having received an enlarged colour print, Steve's prowess with the airbrush added certain obvious, and not so obvious, effects to produce the final result.

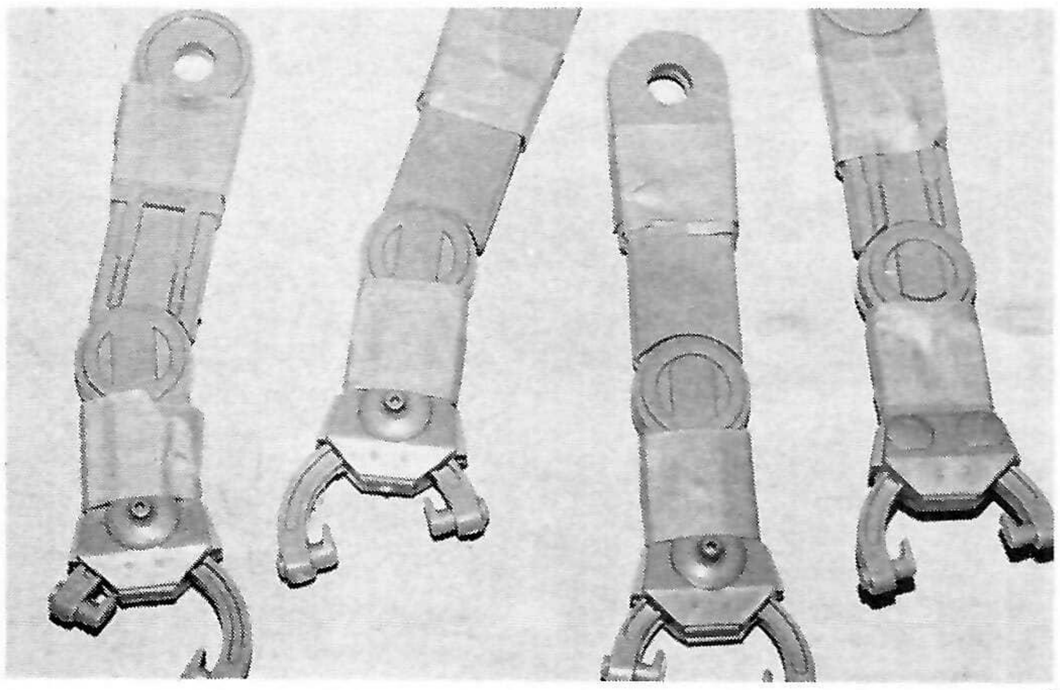
Next prototype for the *New VOYAGER* treatment is the Airfix *Snowspeeder* which will form the subject of a special diorama. Be looking for you next time . . . *

Credits

Models and b/w photography: Ray Rimell.
'Special effects' airbrushing on colour photograph: Steve Archibald.
Studio Colour Photography: Manny Cefai and Neil Proctor.
Hand printing from original transparency: **Colab, Ltd.,** of Coventry.

Acknowledgements

Many thanks to Susan Trembly of **Lucasfilms, Ltd.,** for providing colour transparencies and production drawings.



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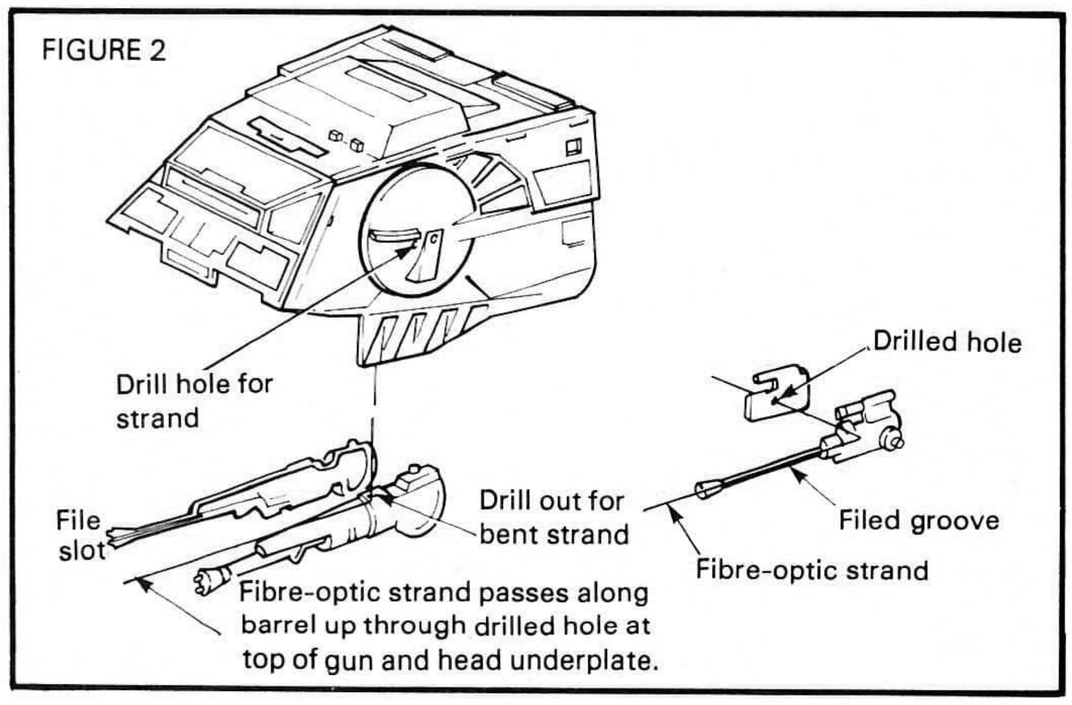
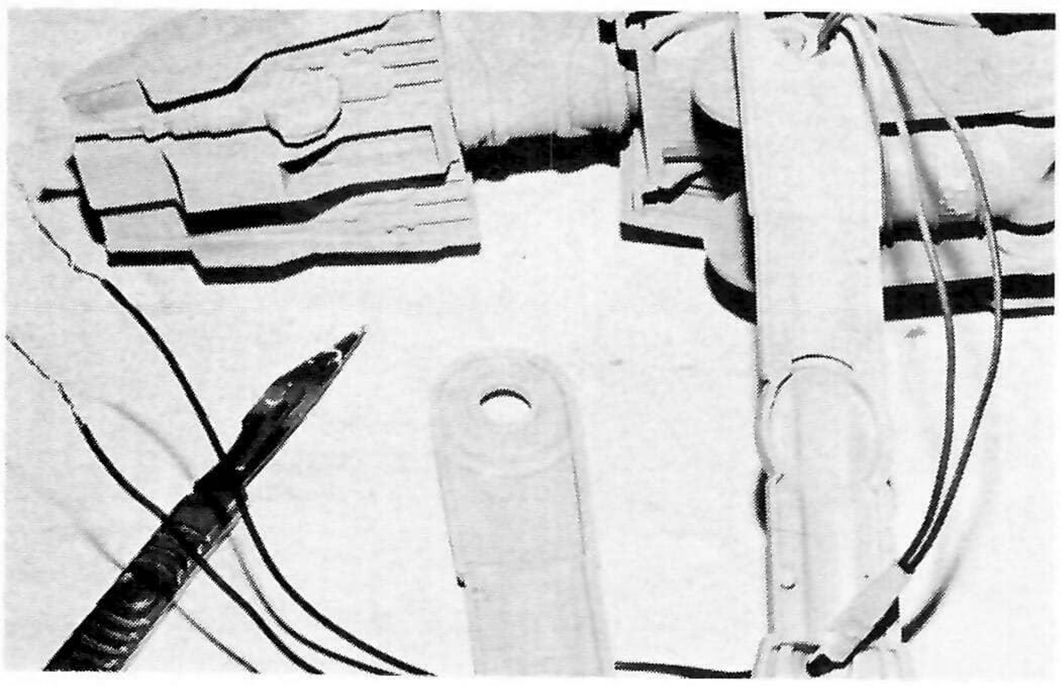


FIGURE 2
Drill hole for strand
Drilled hole
File slot
Drill out for bent strand
Filed groove
Fibre-optic strand
Fibre-optic strand passes along barrel up through drilled hole at top of gun and head underplate.



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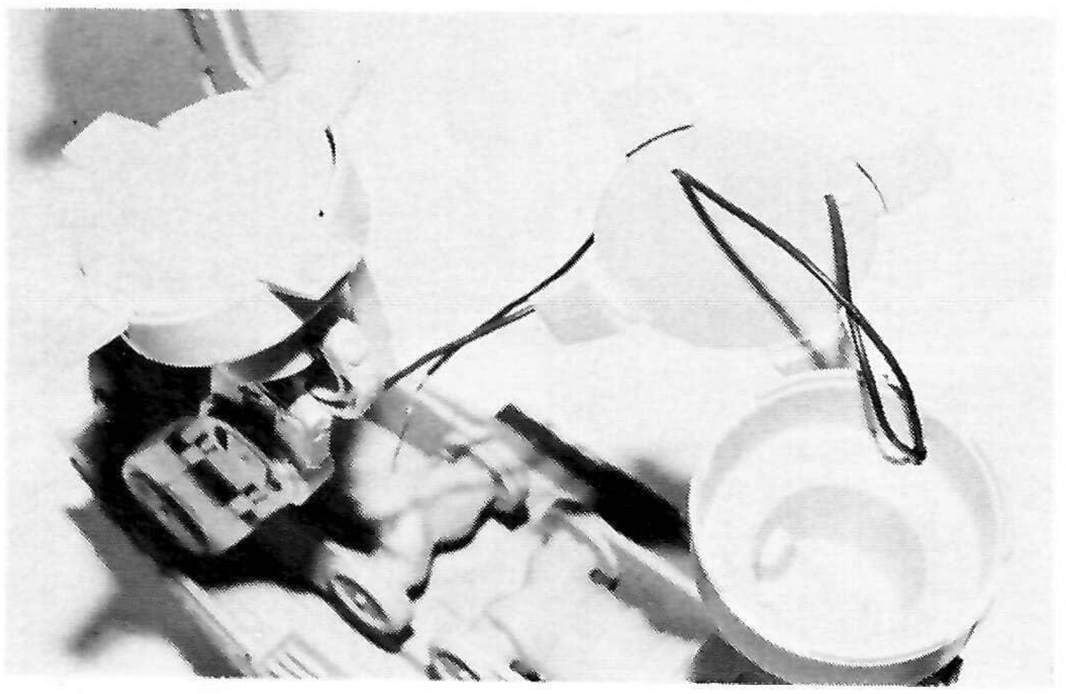

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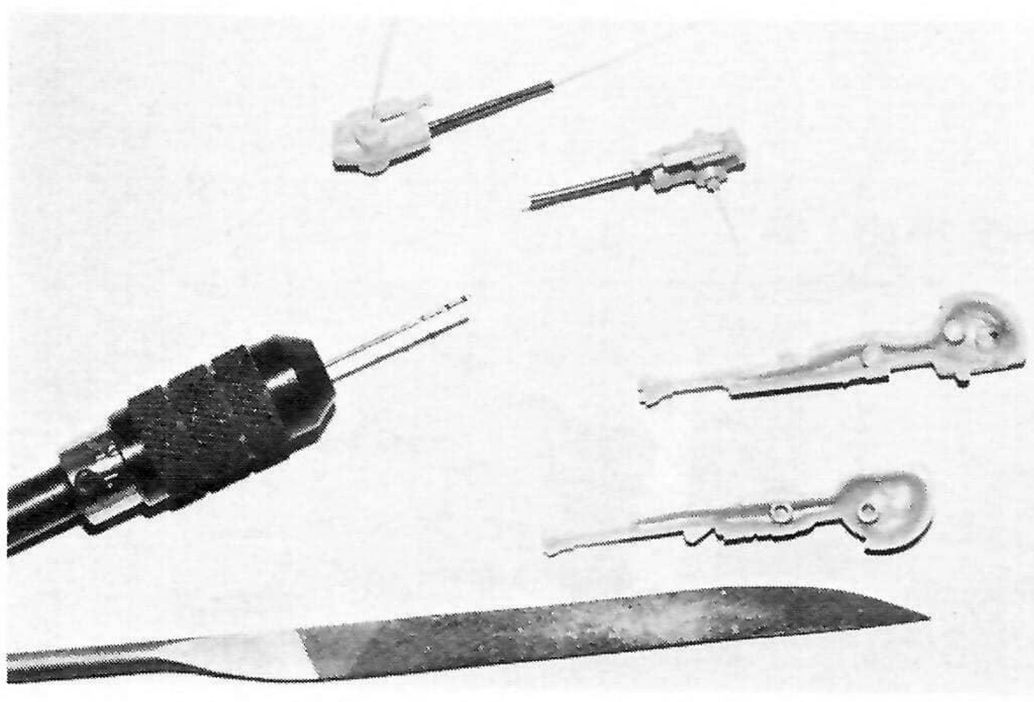

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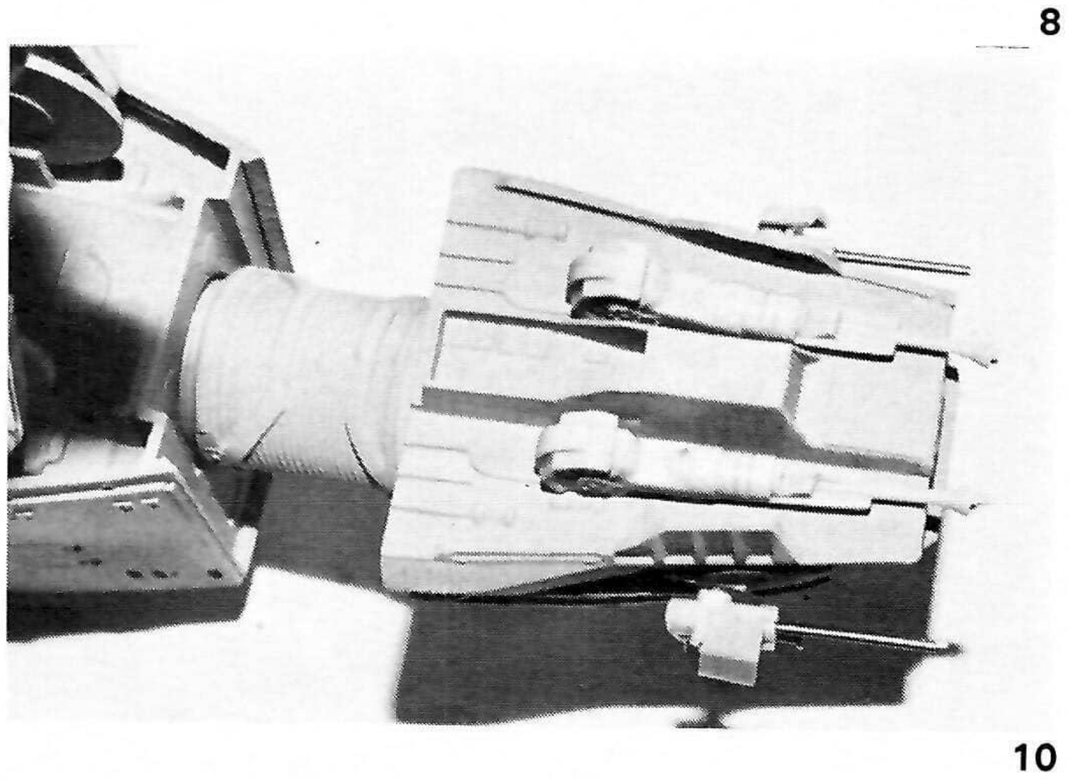

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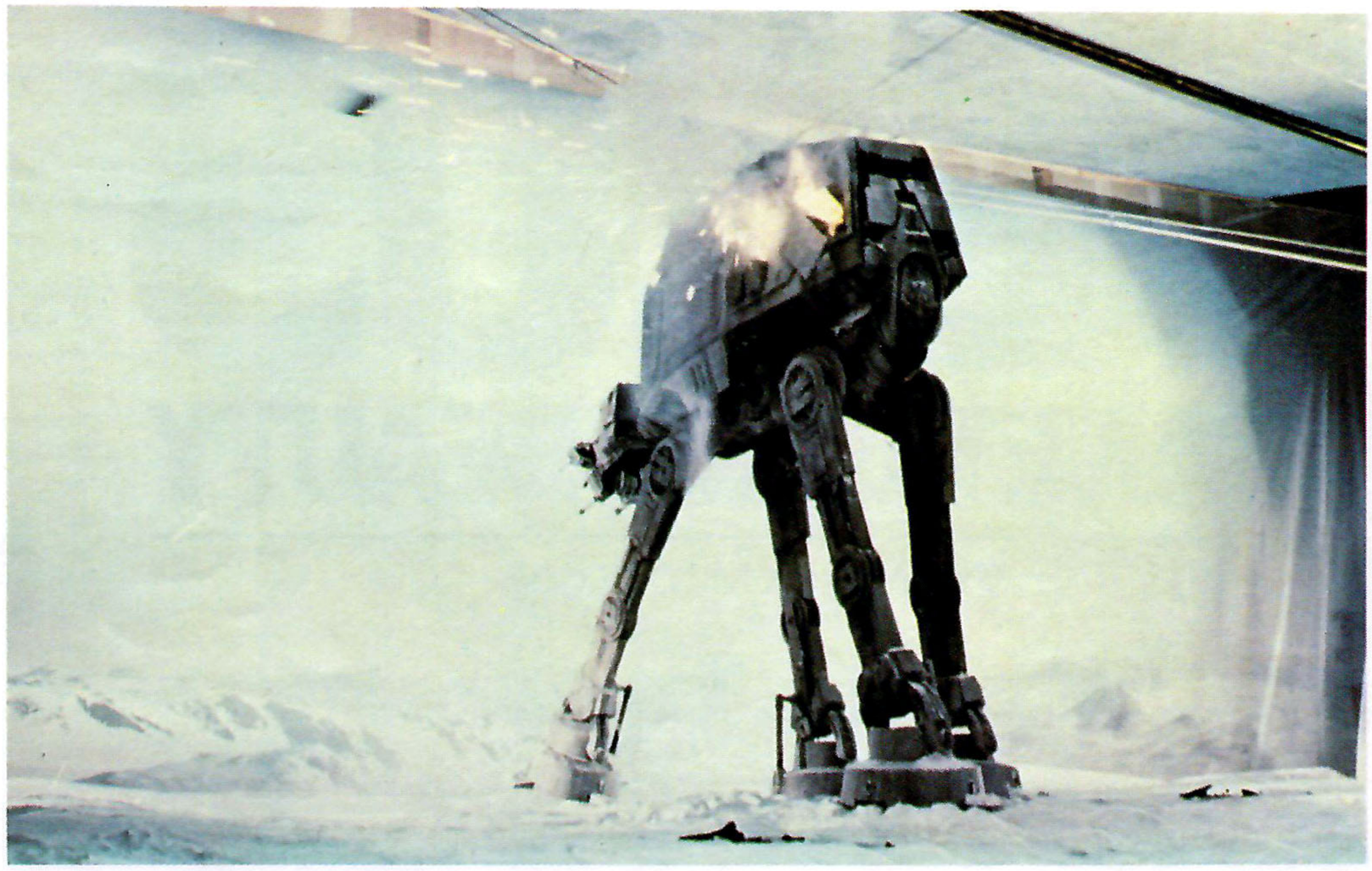
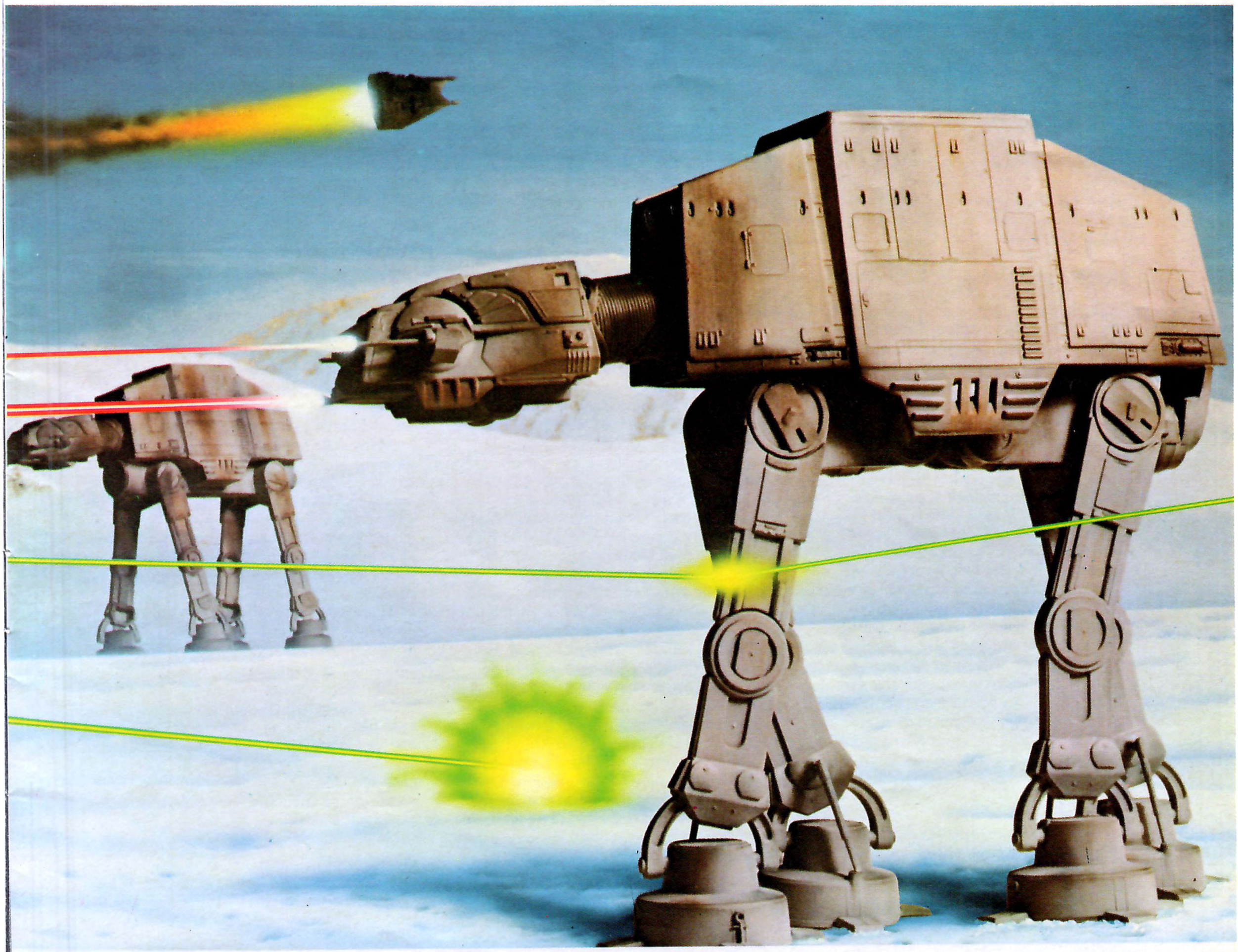
Right, actual SEX AT-AT Walker exploding during filming of 'The Empire Strikes Back'. High-speed explosions are used for enhancement in final composite. Photo: Terry Chostner, courtesy Lucasfilm Ltd.
Below, Airfix/MPC AT-AT as built and modified by Ray Rimell with 'SFX' added by Steve Archibald. Odd scale of Snowspeeder *included with the kit goes unnoticed in this specially-staged picture. Original photo: Manny Cefai/Neil Proctor.*





VENUS
PLANET OF NO BEAUTY

BY PATRICK MOORE OBE

There can be little doubt that to naked-eye observers, the most beautiful planet by far is Venus. It is much brighter than any object in the sky, apart from the Sun and Moon, and when at its best can cast perceptible shadows. It is only very slightly smaller, and less massive, than Earth and is closer to us than any other planet. It can approach Earth to within 25 000 000 miles, whereas Mars is always at least 34 000 000 miles away.

This being so, it is surprising to find that, before the onset of the space-probe era, our knowledge of Venus was remarkably slight. It was often known as 'the planet of mystery', and all sorts of theories about its surface state were proposed. We knew the length of Venus revolution period or year – 224·7 Earth-days – but what was the length of the Cytherean day?* Estimates ranged from 'about 24 hours' to 'a few weeks'. Some time ago I tabulated all the estimates of the rotation period which were made between 1666 and 1961. There were over a 150 of them – and every single one turned out to be wrong!

The main problem was that no telescope will show much detail on Venus' surface. The only evident feature is the characteristic phase and there is nothing mysterious about this; like all the planets, Venus has no light of its own and everything depends upon how much of its sunlit hemisphere is turned in our direction. When Venus is more or less between Earth and the Sun, it is 'new' and cannot be seen (except when the alignment is exact, producing a transit with Venus in silhouette against the solar disc; but this does not happen often and the next transit will not be until 2004). When Venus is full, it is on the far side of the Sun and so is virtually out of view. Maximum brightness occurs when Venus shows as a crescent.

The vague shadings seen from time to time look like clouds and, indeed, this is an accurate description of them. They shift and change and it is usually hopeless to try to define their exact positions. This is why the rotation period was so hard to measure; there are no clear-cut surface features as there are on Mars. Certainly, the actual surface of the planet is permanently obscured; it is always cloudy on Venus.

Spectroscopes showed that the bulk of the Cytherean atmosphere is made up of carbon dioxide. Now, we know that carbon dioxide tends to act in the manner of a greenhouse, shutting in the Sun's heat and since Venus is closer to the Sun than we are (67 000 000 miles on average as against our 93 000 000) it looked as though the surface must be hot. On the other hand, our spectroscopes could only reach the upper atmosphere and conditions lower down could have been different – though admittedly, carbon dioxide is a heavy gas and would be expected to sink rather than rise.

Before 1962 there were two main theories. The surface of Venus might be mainly water-covered, or it might be a raging dust-desert, without a trace of moisture. The ocean theory was favoured by two eminent American astronomers, F L Whipple and the late D H Menzel, and looked fairly attractive (moreover, the carbon dioxide of the atmosphere would have fouled the waters producing oceans of soda-water!) Further, life on Earth began in the seas at a time when the terrestial atmosphere contained much more carbon dioxide and much less free oxygen than it does now; the change-over was due to land plants and took a long time even after life first emerged from the oceans. It seemed at least possible that the same was true of the modern Venus, so that it might be a world in what we could term a 'Coal Forest' period.

Sadly, this alluring hypothesis was torpedoed as soon as *Mariner 2* sped past Venus in 1962; the surface proved to be much too hot for any liquid water to exist. The modern value for the surface temperature is of the order of 900 degrees Fahrenheit and no water could survive under such conditions despite the high pressure.

Mariner 2 also indicated that Venus has virtually no magnetic field. This *was* a surprise, because such a field had been widely expected – and was also linked with the Ashen Light, or faint luminosity, of the night side of Venus. The Ashen Light had been seen by most experienced observers of the planet and was attributed to electrical phenomena in the Cytherean atmosphere; this led to the probable existence of a magnetic field. (Few people agreed with a last-century German astronomer, Franz von Paula Gruithuisen, that the Ashen Light was due to vast forest fires lit on the surface of Venus by the local inhabitants to celebrate the election of a new Government!) Finally, *Mariner 2* confirmed that the axial rotation period is very long.

This latter finding was not so unexpected because it had already been reported by Earth-based radar research; it had become possible to 'bounce' radar pulses off Venus and to receive the 'echoes'. We now know that the rotation period is 243 Earth-days. Yet the Cytherean revolution period is less than 225 Earth-days and we find that on Venus the 'day', in the astronomical sense, is longer than the 'year'. To complete the picture, Venus spins from east to west instead of west to east so that an observer standing on the planet would – theoretically – see the Sun rising in the west and setting in the east. In practice, of course, the Sun would never be visible at all because of the permanent, obscuring, cloud-cover.

Space probes to Venus

All ideas of colonizing Venus, at least in the foreseeable future, had to be abandoned as soon as *Mariner 2* sent back its results, further probes provided ample confirmation. *Mariner 10* by-passed Venus in early 1974 on its way to Mercury, and transmitted excellent pictures of the cloud-tops confirming another strange fact; although the solid planet spins so slowly, the upper clouds have a rotation period of only four days. Obviously, there is something very peculiar about the planet's atmospheric structure.

But the Russians had entered the field, and had begun an intensive effort to find out something positive about the surface of Venus. Their *Venera* probes were designed to release capsules which would come down through the atmosphere and make gentle landings. Such a procedure was remarkably difficult; the intense heat and crushing pressure alone would test any man-made probe and thus it is not surprising that the Russians had several failures. It is greatly to their credit that they persevered, and by now they have made several successful soft-landings. Four probes – *Veneras 9, 10, 13* and *14* – were able to transmit one picture each, and to continue operating for an hour or so after arrival before being permanently silenced by the hostile environment.

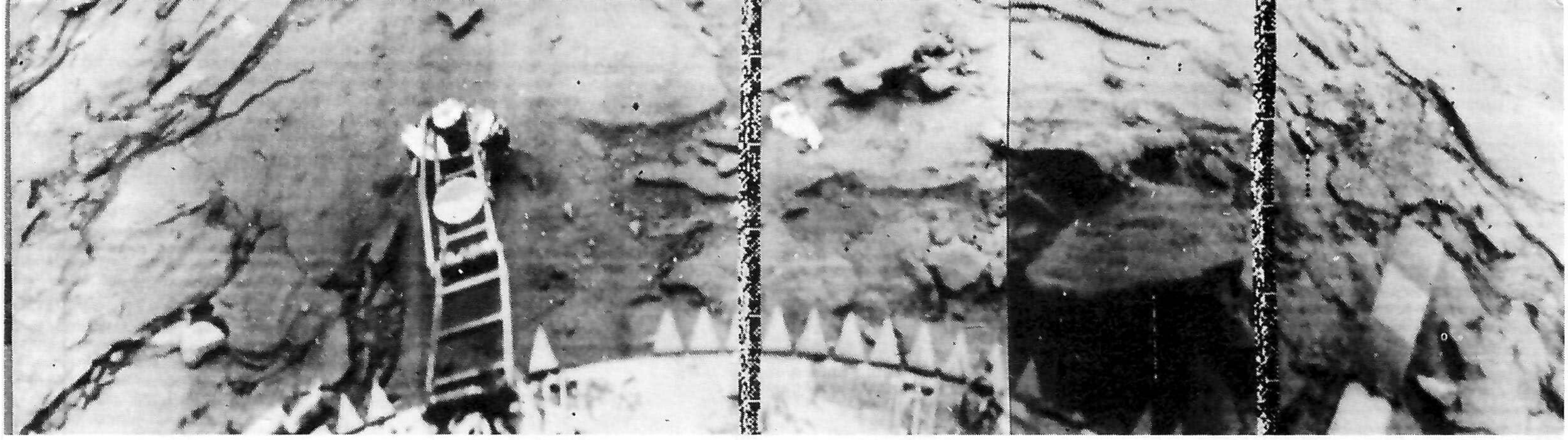
The surface is rock-strewn and looks as bleak a picture as could be imagined. Windspeeds were measured and found to be fairly light – a few knots – but in that thick atmosphere they would have tremendous force. The light-level was rather brighter than had been expected, and was compared with that in Moscow at noon on a cloudy winter day. The first successful soft-landers took searchlights with them but apparently artificial illumination was not required.

Meanwhile, another sinister discovery had been made. Those lovely-looking Cytherean clouds contained large quantities of sulphuric acid, which is about as unfriendly a substance as could be visualized. In every way Venus was a hostile world and appeared to be somewhat like the conventional idea of hell – the Whipple-Menzel ocean was as unreal as the mythical canals of Mars.

There was, however, one intriguing theory which was not borne out by the facts. It had been suggested that the atmosphere of Venus was so dense at ground level that it would be 'super-refractive', *viz;* an observer would have the impression of standing inside a bowl. It had even been suggested, rather facetiously, that any 'Venusian' looking straight ahead would see the back of his neck! But this was not the case. Indeed the range of visibility was somewhat greater than had been expected for beneath the lower cloud-deck there is a comparatively clear region. The sky itself proved to be a brilliant orange colour.

Meanwhile, there had been new American efforts – in a rather different direction. In late 1978, their Pioneer probe reached the neighbourhood of Venus. To be precise there were several parts of the mission, including

There is no official adjective for Venus. 'Venusian' is ugly, 'Venerian' is worse. I prefer 'Cytherean' which may be less correct, but which seems to be coming into general use.



Above, panoramic view of the Venus surface taken by Venera 14's descent module. At left is the ground probe and at right, the test colour table. Photo: TASS.

some small entry vehicles which came down and even transmitted briefly, but the main vehicle was an orbiter, put into a closed path round the planet and which began studying the surface by means of on-board radar. The results were striking. Within a matter of months a complete map of about 80% of Venus had been obtained. There were uplands, valleys, craters – and volcanoes. None of these could ever be seen directly because of the permanent cloud-mantle but they could be positioned very accurately indeed.

The main feature proved to be a huge rolling plateau, extending right round Venus and covering more than half the total surface. From it rose two major uplands; Ishtar Terra in the north, about the size of Australia, and the larger, Aphrodite Terra, close to the equator. (The nomenclature caused some discussion, but it seems appropriate enough.) Of the two, Ishtar is the higher and is made up of a lofty plateau carrying several mountain ranges. The western part – Lakshmi Planum – is a plateau bounded by peaks. At the east end of Ishtar are the Maxwell Montes (Maxwell Mountains) which rise to 35 400 feet above the mean level of the planet and are the highest elevations anywhere. Aphrodite runs almost parallel with the equator with rough, broken mountains and a huge circular basin which is presumably volcanic. At its east end is the Rift Valley, 9500 feet deep, and from here extends a region which has been nicknamed the Scorpion's Tail

Even more interesting was the area known originally as Beta Regio. It has been found to contain two high shield volcanoes, Rhea and Theia, which are identical in type with our own Mauna Kea and Mauna Loa on Hawaii and, for that matter, Olympus Mons on Mars. All the evidence indicates that the two Cytherean volcanoes are active, and that there is also activity at the Scorpion's Tail. Lightning is almost continuous in these regions, with thunder as well, so that Venus is a pretty noisy planet as well as a hostile one.

Venus evolves

Clearly, then, Venus and Earth are dissimilar. On our own world, the science of plate tectonics has become all-important since the realization, 20 years ago, that the old theory of continental drift – that the continents 'float around', so to speak, occasionally colliding and producing mountain ranges – has to be accepted after all. There are half a dozen plates all in slow motion. But Venus is much simpler, it is a one-plate planet, so that vulcanism can occur only in certain preferential areas. Beta Regio and the Scorpion's Tail may not be the only ones, but they are almost certainly the most violent.

Armed with this information we can try to decide just why Venus has evolved in this peculiar way, and why it is so different from Earth in spite of the close similarity in size and mass. The root cause must be the lesser distance from the Sun – over 20 000 000 miles – and, incidentally, the orbit of Venus is almost perfectly circular. It used to be thought that the surface was never cool enough for water to form; tremendous heat drove the carbonates out of the surface rocks, producing carbon dioxide in the atmosphere and leading to a 'runaway greenhouse' effect. Now, however, there have been second thoughts. Venus may not always have been so unfriendly as it is today. In its early days it may even have had oceans and a relatively temperate climate.

Here we must look briefly at the history of the Sun. Like all other stars it was produced from interstellar dust and gas; since Earth is about 4700 million years old, a reasonable estimate for the age of the Sun is 5000 million years. It is shining not because it is burning, but because of nuclear transformations going on deep inside it. Briefly, hydrogen is being converted into helium, with the resultant release of energy and loss of mass. It is this energy which keeps the Sun shining, while the mass-loss amounts to 4 000 000 tons every second. (I assure you there is no need for alarm. The Sun can tolerate this wastage for another 5000 million years or so before anything drastic happens to it.)

The planets built up by accretion from the 'solar nebula', a disc-shaped cloud of material associated with the youthful Sun. Both Venus and Earth were presumably formed at about the same time. But – and this is the crux of the whole problem – in its early days the Sun was less luminous than it is now. It had only about 70% of its present power. Therefore, Earth and Venus began to evolve along similar lines; there were atmospheres of the same type, and probably, oceans as well. Quite possibly life began on both worlds at about the same time and with Venus this life may even have started to emerge from the water onto the land.

But this was too good to last. Slowly the Sun became hotter. Earth, at 93 000 000 miles, was out of harm's way, but Venus was not. As the heat increased, the Cytherean oceans boiled, the rocks were robbed of their carbonates, and all life was inexorably destroyed, until at length Venus became the furnace-like environment which we know at the present time.

What proof is there? We may find valuable clues in studying the relative amounts of ordinary hydrogen and 'heavy hydrogen', or deuterium, present in the two atmospheres at the present moment. On Earth, hydrogen is the more plentiful in the ratio of 15 000:1. On Venus, the ratio is only 160:1. It has been suggested, then, that as the heat increased, hydrogen was driven out from the Cytherean oceans into the atmosphere and then escaped Deuterium is heavier, and was not lost so easily. This means that the deuterium now found in the Cytherean atmosphere is an observable remnant of the original ocean.

If this is true – and the evidence does seem to point that way – then Venus must be regarded as a tragic world. Life made a promising start, but was given no opportunity to develop before conditions became hopeless for it to survive.

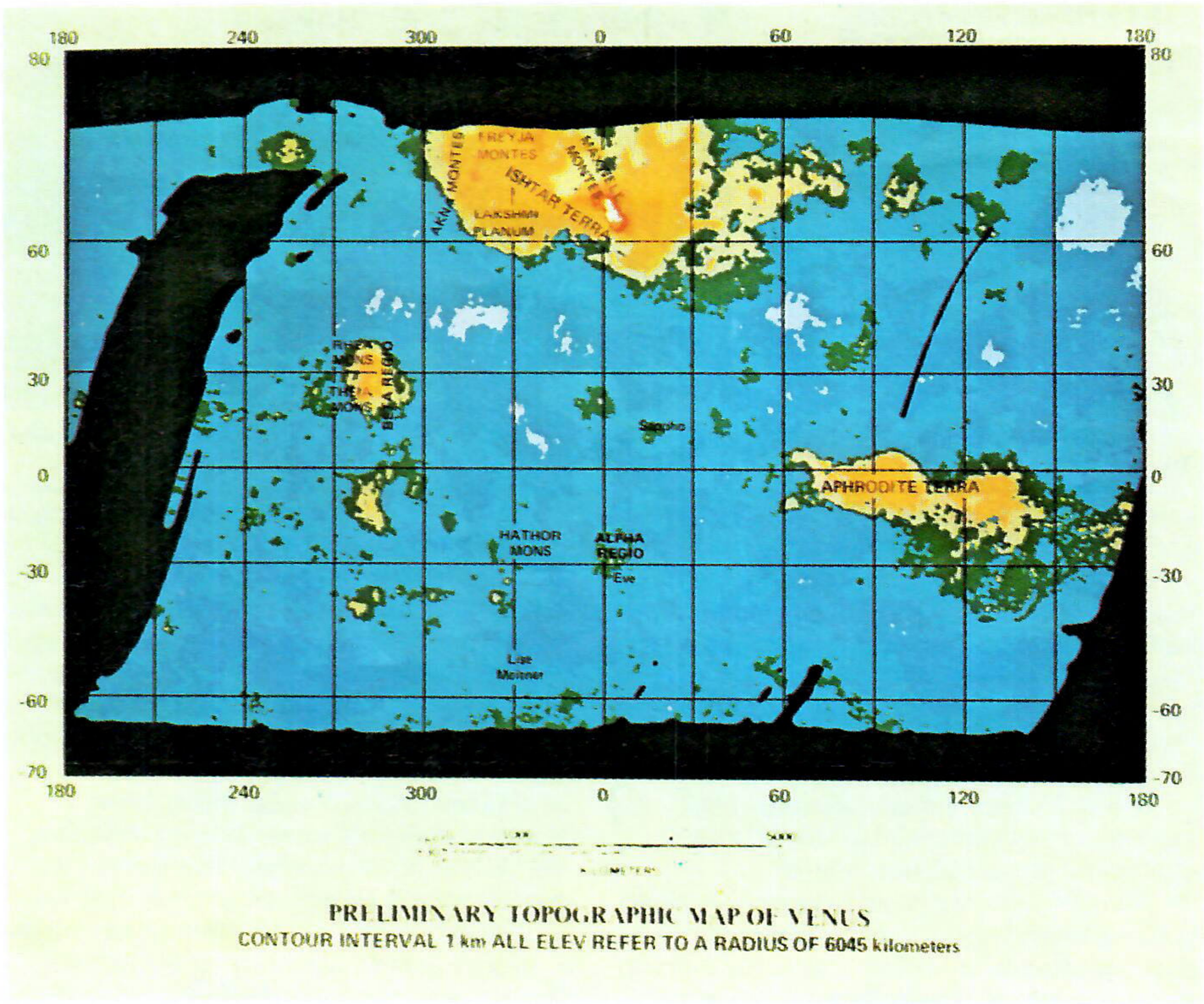
What, then, of the future? There seems no chance that Venus will cool down and the only possibility of its becoming habitable once more is by artificial intervention. Years ago, Dr. Carl Sagan suggested that it might be possible to 'seed' the atmosphere, breaking up the carbon dioxide and releasing free oxygen. If this could be done, the greenhouse effect would be reversed, the surface would become colder, and water might once more form. At the moment anything of the sort is quite beyond our capabilities, but in the distant future the situation may be different.

There is, however, another fact to be taken into consideration. The Sun is not cooling. On the contrary, it will eventually become at least 100 times as luminous as it is now. When its supply of available hydrogen 'fuel' is used up, the core will shrink and the outer layers will expand; the Sun will turn into a Red Giant star, as Betelgeux in Orion and Antares in Scorpio are now. Venus and the inner planet Mercury will be engulfed. Even if Earth escapes, it will suffer a frightening increase in temperature. Our oceans, too, will boil, and the end product may be an earth very much like the Venus of today.

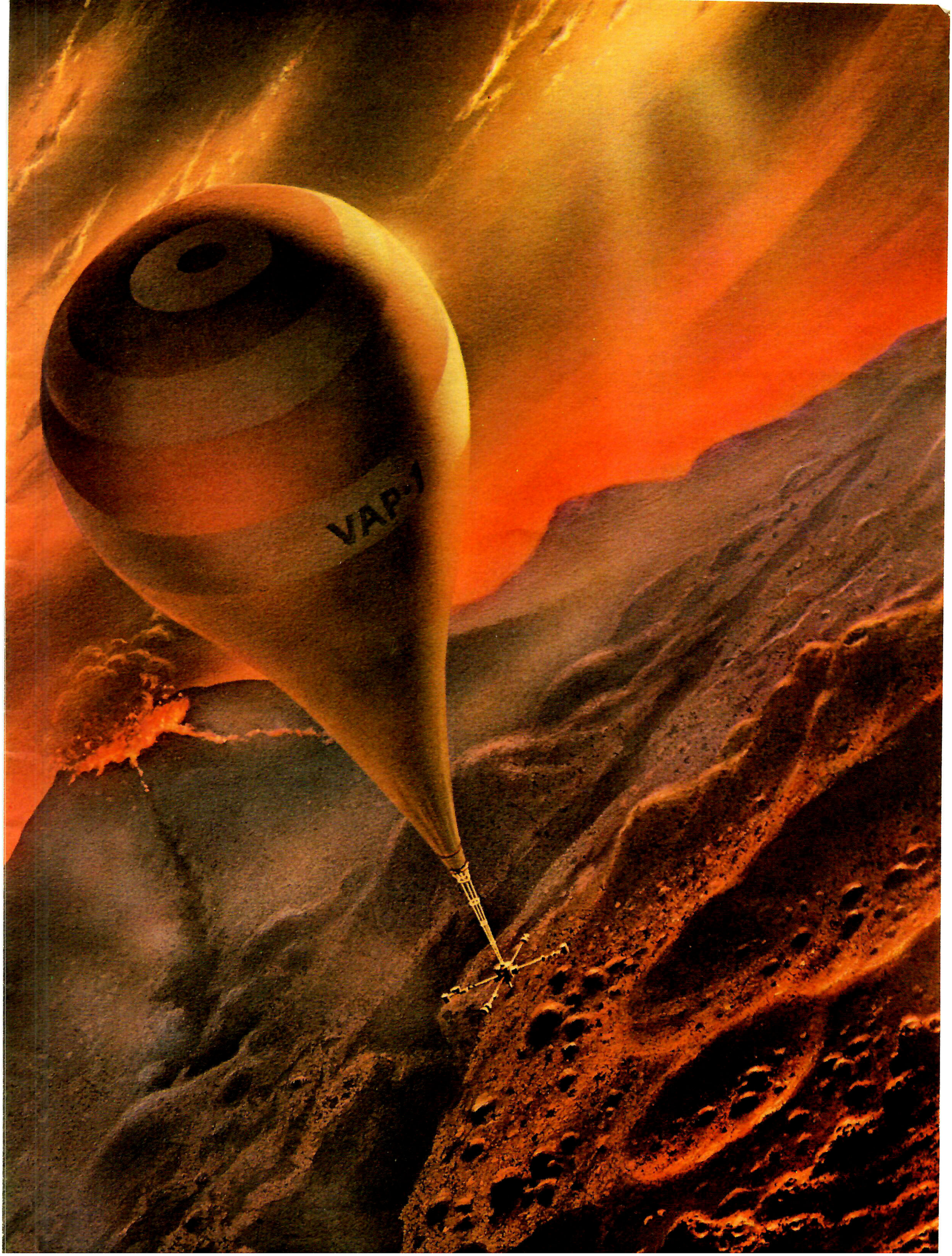
It is not a pleasant prospect but it is always possible that, if mankind survives until that distant epoch, we may have enough knowledge to save ourselves – either by moving the earth further from the Sun – or by mass migration. Finally, the Sun will collapse into a very small, dense, feeble White Dwarf and the searing heat will be replaced by biting cold. Venus will no longer exist and if Earth is not destroyed, it will unquestionably have become uninhabitable by our present standards.

Of course, all this lies so far ahead that speculation is endless. But we may learn something from Venus; if Earth had been a mere 20 million miles closer to the Sun, we would not be here.

Venus still presents us with many problems. Manned landings cannot be planned, as yet, and may never be possible. No doubt there will be further probes, both landers and orbiters, so that we will be able to draw up a really accurate picture. Yet one thing is certain, as a potential colony, Venus has been a disappointment and, as always, we come back to Mars which is at least bereft of a corrosive atmosphere.*



Three views of an inhospitable world. Opposite, this dramatic painting by David A Hardy portrays a Venus Atmosphere Probe over the surface and, below, Paul Doherty's fiery vision of our nearest planetary neighbour. At right, this contour map of Venus is a Mercator projection that covers about 80% of the surface from 75° north to 63° south. The contour interval is half a kilometer while all elevations refer to a radius of 6045 km. Beta Regio, the circular highland region shown by the largest yellow contour on the western side, appears to be two huge shield volcanoes, larger even than the entire Hawaii-Midway chain on Earth. Photo: NASA.


VAP

MODEL ROCKETRY

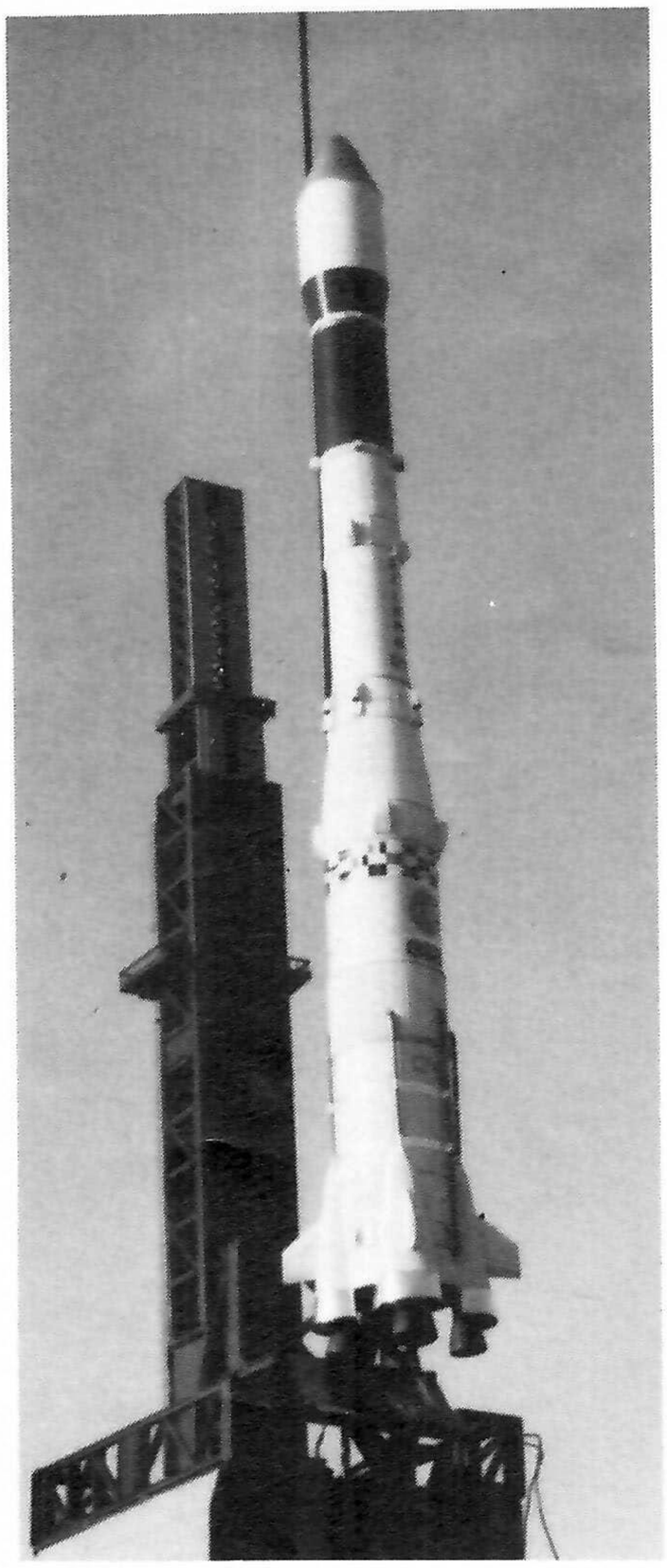
– A SPACE AGE HOBBY

PAUL CLARKE AT THE LAUNCH PAD

The flying of rocket-powered (usually firework) models is not new to Great Britain. As long ago as 1936 pioneer enthusiast John Stewart founded the *Paisley Rocketeer,* and several Rocket Clubs, such as the Leicester Rocket Research Society, sprang up after the Second World War. Unfortunately, the authorities here have taken an obstructive attitude to such activities compared with those in other countries and the 1875 Explosives Act has been invoked against participants. However, the flying of Model Rockets is not in itself illegal if carried out in a responsible manner. The Home Office objection is a technicality based on their contention that the reloading of a model with a new 'motor' constitutes the 'manufacture' of an explosive device! Obviously there is an element of hazard with *any* pyrotechnic device but for a country which allows the open sale of fireworks the restriction of this rewarding hobby seems petty.

It was the desire to prevent teenagers attempting to make their own chemical propellants, which often resulted in tragic accidents, that led Orville Carlisle, a Nebraskan businessman, to design a reliable, and safe, solid fuel mini-rocket motor to propel light-weight models in 1954. It was similar to a black powder firework rocket but with an accurately-machined ceramic nozzle and a small expulsion charge to eject a parachute, or streamer, at the end of the flight. The expended motor could then be replaced and the model flown again. Commercial production of model rockets commenced in 1957, the year that Russians put the first *Sputnik* into orbit and this gave the infant hobby a great boost as interest in space exploration increased. In 1960, the National Association of Rocketry was formed to regulate the hobby in the USA and help individual clubs overcome the prejudice of local authorities against the hobby. By demonstrating that the propellant 'motors' can be crushed, sliced and generally abused without hazard, and by laying down a common-sense safety code which all members of the NAR must observe, they proved to sceptics that the hobby is very safe. In the 20 odd years it has existed it is estimated that over 20 million model rockets have been flown without a single serious accident. (Incidentally, the NAR insures its members for two million dollars public liability.)

The hobby is now respectable and sponsored by such bodies as NASA, the USAF and the US Boy Scouts who have to build, and fly, a model rocket as part of their Space Exploration Merit Badge! In the USA and many other countries, where the hobby is established, it is incorporated into schools, science programmes and consequently encourages an interest in space sciences.



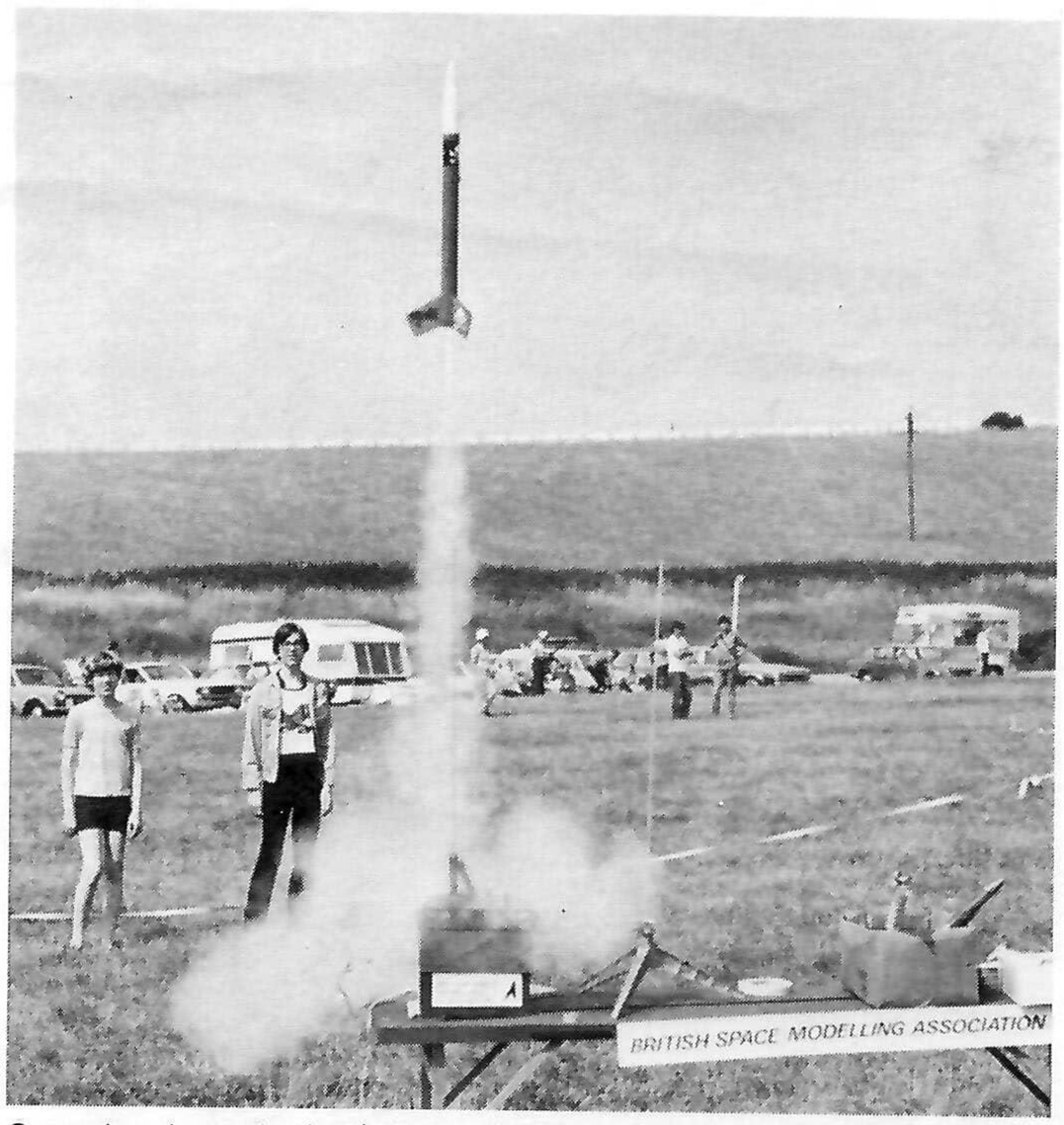
Model rockets are made only from lightweight materials, such as card tubes, balsa and plastics. The maximum permitted weight of a model is 16oz. (453 grams) propelled by a maximum of 4oz. (113 grams) propellant, though most are much lighter than this. There are two main manufacturers of kits and motors in the USA, **Centuri** and **Estes,** and the products they manufacture, particularly the propellant 'motors', have become the international standard for competition. They are coded A, B, C and D, relative to their size and thrust. For instance an A motor is 1·75 inches long and half an inch in diameter and can lift 2oz., while a D motor is 2·75 inches long, 0·95 inches in diameter and can lift 10oz. The models are all launched by electrical ignition from a 12 volt battery, *ie, no* blue touch-papers!

These companies, and smaller ones, manufacture a wide range of kits varying in complexity from a simple snap-together model that can be readied for flight in minutes, to a 1/100th scale Saturn V that requires much skill and many hours to build. Component parts are available for the true enthusiast to scratch build models just for fun or, for competitions, build 'sport' rockets that will out-perform others in the same class. Fortunately, the aerodynamics of rockets is quite simple to grasp.

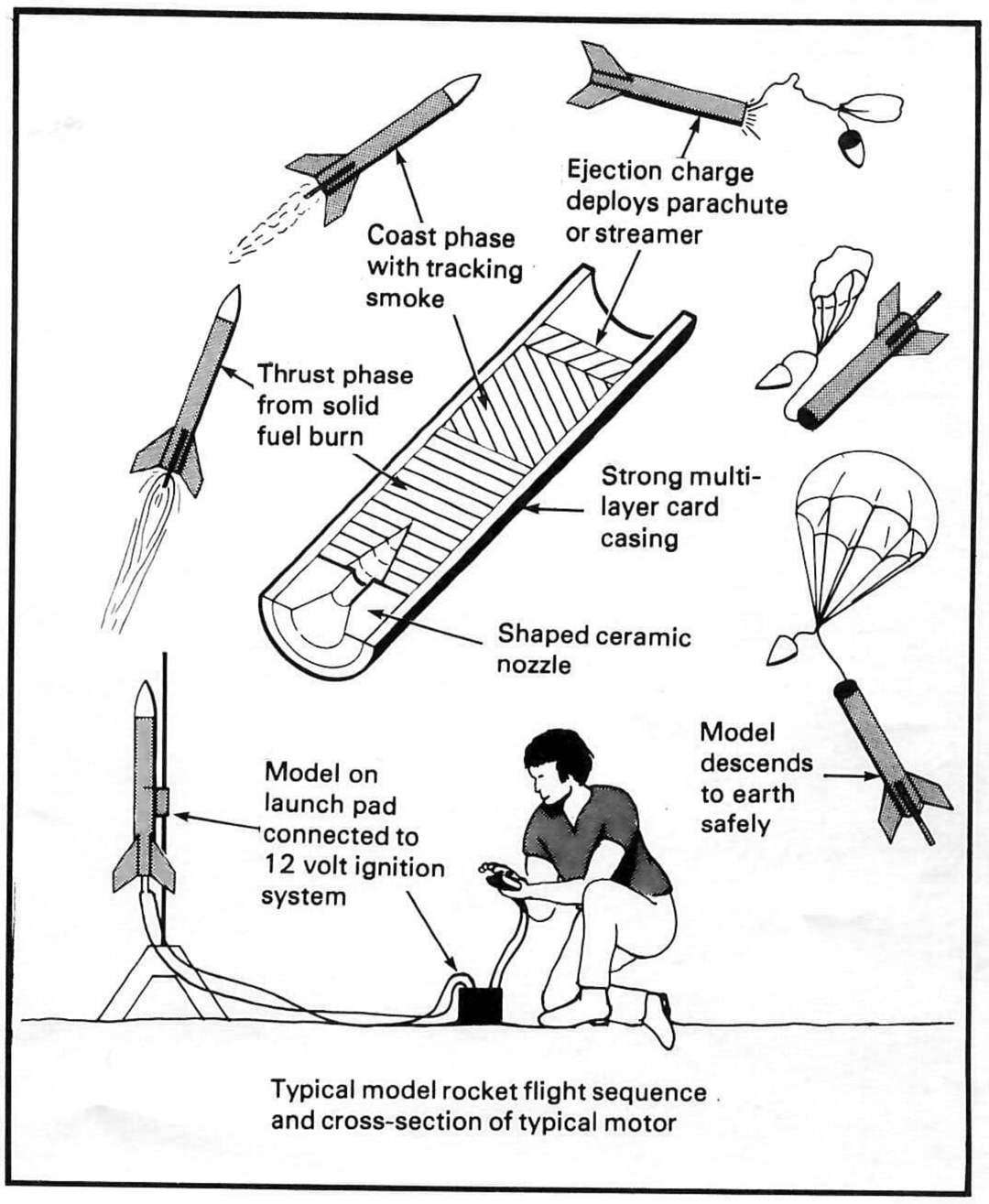
The hobby is truly international and recognised by the *Federation Aeronautique Internationale* (FAI) in Paris, who are responsible for regulating all flying-related sports. There have been four World Space Modelling Championships, three in Eastern European countries, and the last, in 1980, was held in the USA. The competition events there were: Parachute Duration, Boost Glider Duration, Payload Altitude, Scale Altitude and Pure Scale and teams came from Bulgaria, Canada, Australia, Great Britain, Poland, Spain, West Germany, Yugoslavia and the USA to compete. The next World Championships, originally to have been held in Poland during 1982, are due to take place in Bulgaria next year. As the hobby is recommended for ten year olds upwards it would seem that many people in Great Britain are missing out on this exciting pastime due to official obstruction. It is for this reason that a group of British enthusiasts have founded an association to promote the hobby and challenge the official attitude to Model Rocketry. If you would like more information please write, enclosing an SAE to **The British Space Modelling Association,** 15 High Street, Ditchling, Sussex, BN6 8SU. *

PUBLISHERS' NOTE

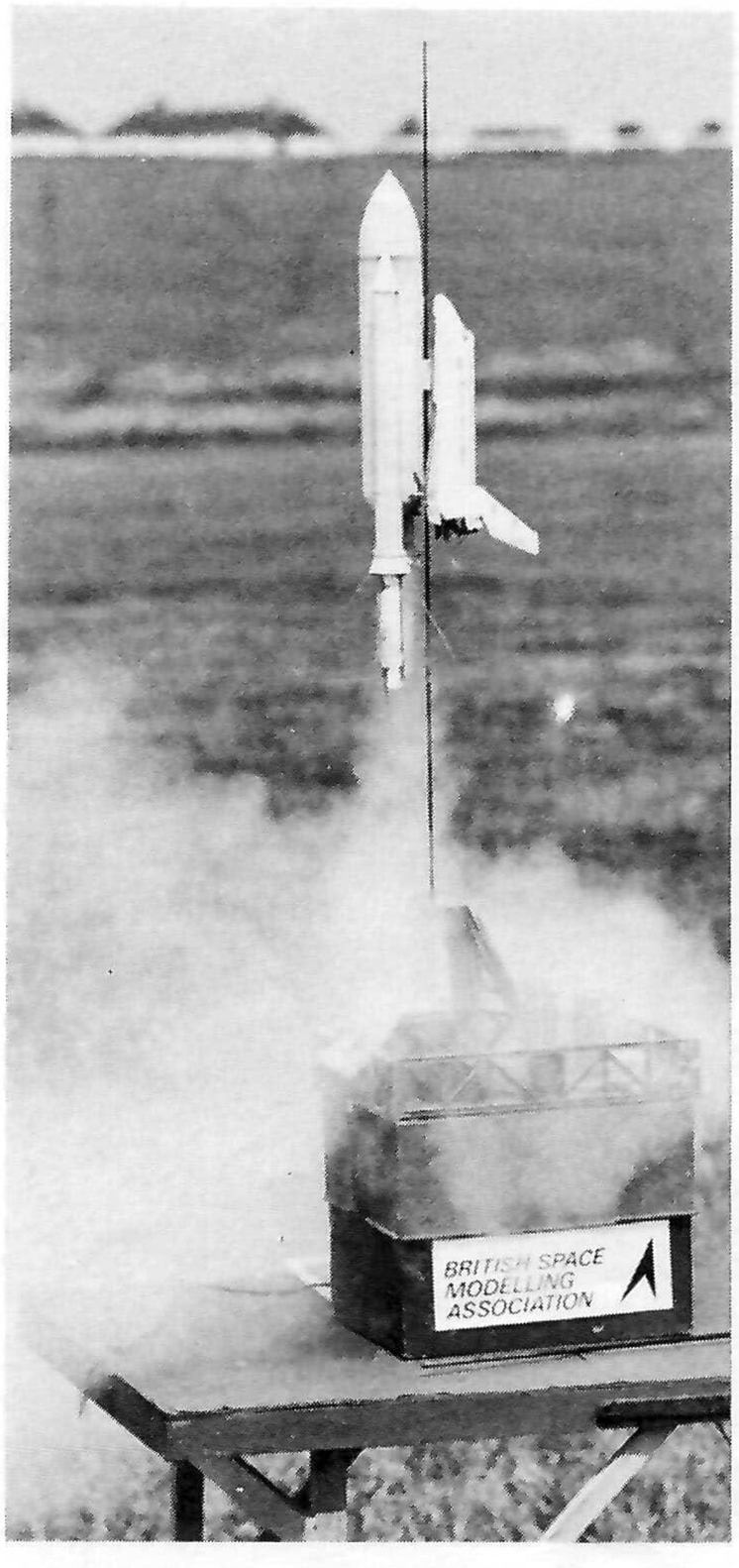
Recently the Home Office department indicated a willingness to discuss the position of model rocketry in the UK, and there is now a distinct possibility that the hobby may become acceptable to them if limited to particular sites. More news when we receive it.

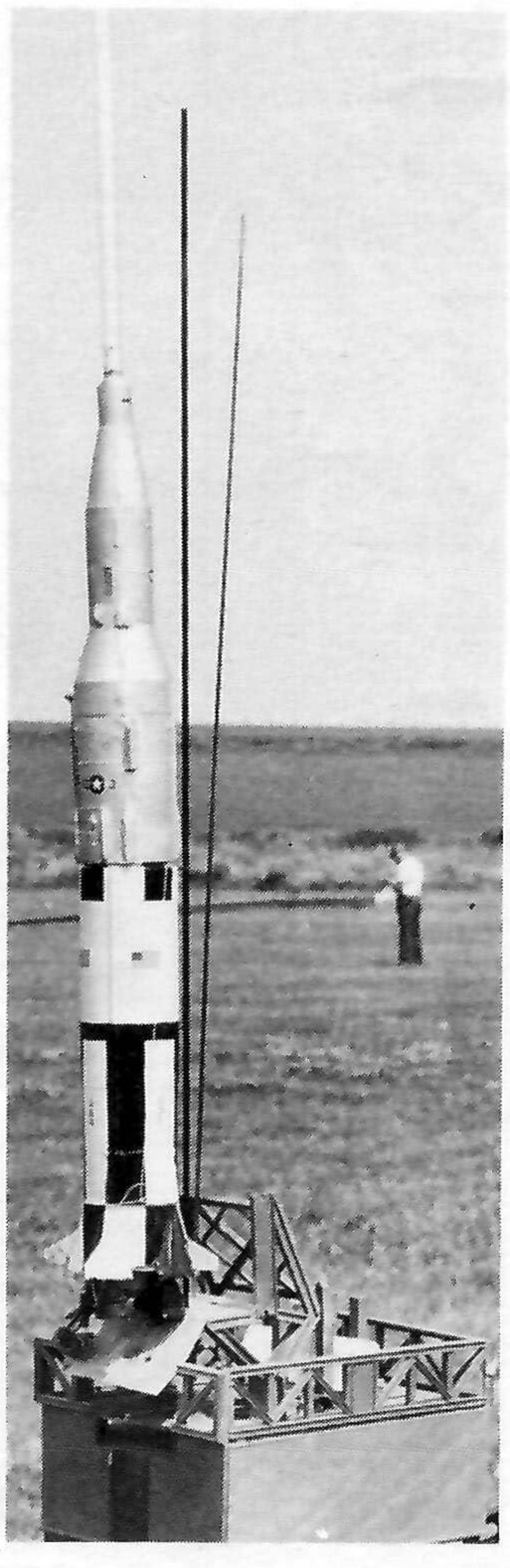


Opposite, the author's 1/50th scale Ariane 01. Above, lift off! Below; left to right, Shuttle blasts off, semi-scale Saturn V rocket on the pad and Paul Clarke himself prepares his Shuttle for launch. Photos: Paul Clarke and Mat Irvine.


Coast phase with tracking smoke
Ejection charge deploys parachute or streamer
Thrust phase from solid fuel burn
Strong multi-layer card casing
Shaped ceramic nozzle
Model on launch pad connected to 12 volt ignition system
Model descends to earth safely

Typical model rocket flight sequence and cross-section of typical motor





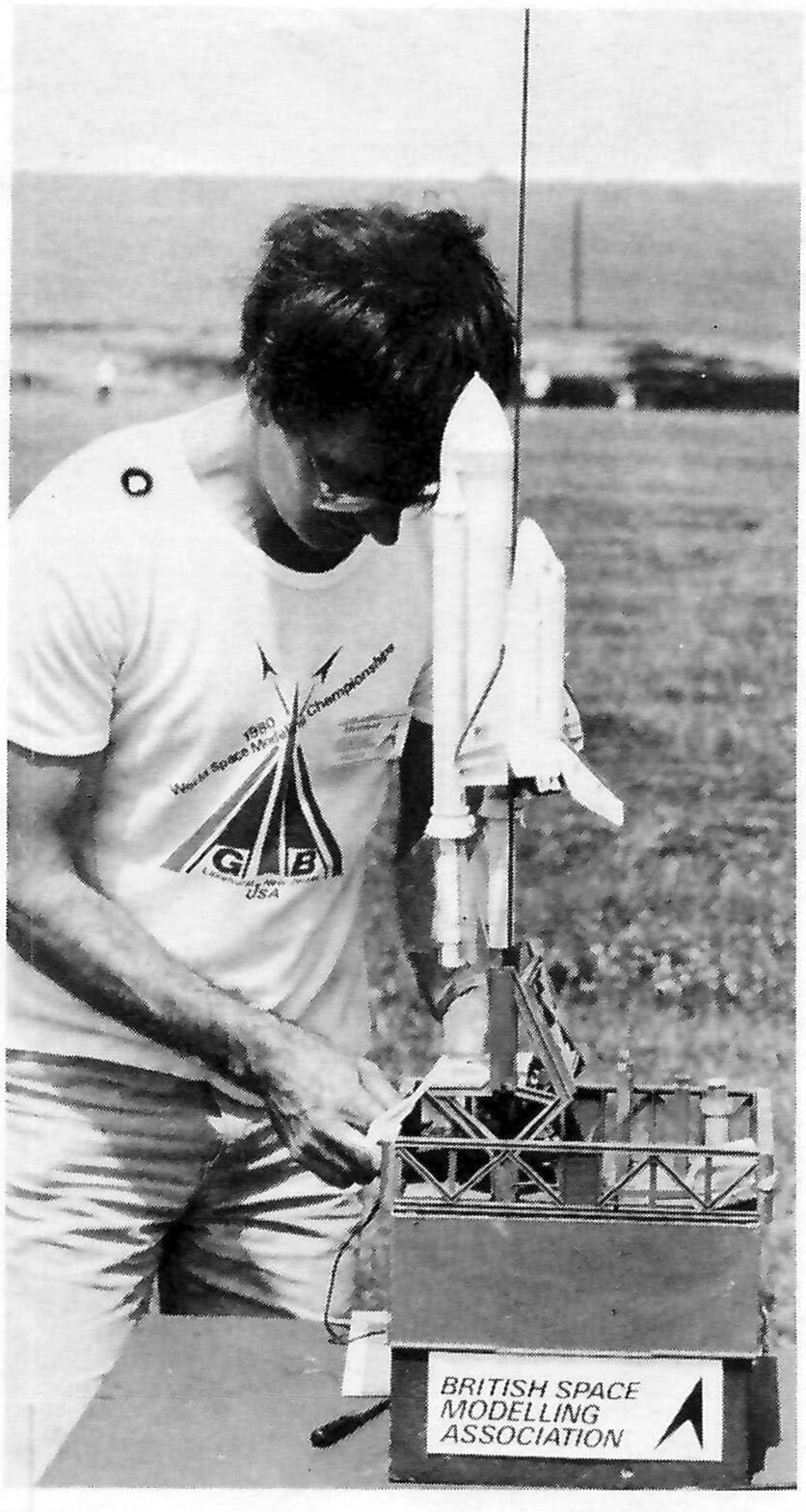


PHOTO: © UNITED INTERNATIONAL PICTURES (UK)

STAR TREK® II THE WRATH OF KHAN

RAY RIMELL OFFERS SOME PERSONAL REFLECTIONS ON THE SECOND FILM

Try to remember one particular episode of *Star Trek*; probably not all that difficult for all you dedicated Trekkers who stay religiously glued to the TV set whenever the series is repeated. The episode I'm recollecting is *Space Seed*, a story written by the late Gene L Coon, and Carey Wilbur, originally aired in the USA on February 16, 1967. Remember the plot? In case your memory banks fail you, allow me to provide a brief, and hopefully accurate, résumé.

Aboard the SS *Botany Bay* in suspended animation, is one Khan Noonian Singh, a genetically superior dictator played by Ricardo Montalban. In the 1990s during the Eugenic's Wars on Earth he had, for a time, ruled over a quarter of the planet. Both Khan and his ruthless band of followers are reawakened by the crew of the starship *Enterprise,* where Khan plans to renew his aims of conquest. He is aided energetically by Starfleet Lieutenant Marla McGivers, an unsuspecting historian who sees in Khan a fascinating living link with the past. The renegade begins his campaign by commandeering the *Enterprise* but, of course, good eventually triumphs over evil and the closing scenes see Khan, Marla and followers exiled to the planetoid Alpha Ceti V by the intrepid Captain James T Kirk.

OK, so what has all this to do with *Star Trek II – The Wrath of Khan*? Well obviously, the title itself should give some indication. Fifteen years on, Khan, still harbouring a deep hatred for Kirk, manages to appropriate the USS *Reliant* and steals Project Genesis – of which more anon – from Space Laboratory Regula One and is thus in a position to tackle his arch adversary on equal terms, dedicating himself to a fight to the death. Khan is again played by Montalban who not only goes over the top, but right over the edge, in reprising his original TV part. This, essentially, is the scenario for the second *Trek* film, and it's a pretty shrewd move on **Paramount**'s part. By linking the story with a past TV episode which fans can relate to, avoiding the temptation to overstretch the SFX footage, and allowing most of the main actors greater opportunity to develop their characters, producer Nicholas Meyer has blatantly achieved his aim; *viz,* bringing the true spirit of the TV series to the big silver screen. Indeed, Paramount have even used snatches of the original theme tune to 'book-end' the film's credit titles.

Now that *Khan* has been on general release all over the UK for a couple of months, a full blown appraisal would be out of order here; it's all been said already and I really don't see *New VOYAGER* as a vehicle for a whole mass of film reviews. There are other magazines to provide these after all and, I must confess, the oft-dismissive and condescending tones of many a Fleet Street scribe will doubtless have already offended a number of *Trek* advocates. Not that this will worry Paramount unduly for *Khan* has been a tremendous box office hit despite the threatened boycott by thousands of US fan(atics) appalled at the pre-release rumours of Mr. Spock's death in the film's climactic scenes. So does the Vulcan get killed off after all? Most of you reading this will already know, but if you haven't seen the film yet I'm not about to spoil your enjoyment by revealing the *denouement*; BBC radio and TV interviewers please note . . .

On reflection, the question of Spock's demise could only really have been treated in one way and that's the way writers Harve Bennett and Jack B Sowards have handled it. But if you really want to know what they came up with, you'll have to go and see the film for yourself.

Star Trek – The Motion Picture was, undeniably, hugely successful in box-office terms, even these days when each new SF block buster is claimed to break all previous records. The film did well enough financially – $17 063 837 in the first week of US release – but it disappointed many fans (this one included). It was overlong and self-indulgent; a special effects extravaganza with the mildly-ageing actors returning to their small screen roles in more or less cameo appearances. There were none of the caustic – but often witty – interchanges between Spock and McCoy, few opportunities for the characters to really develop their persona, and the story itself was rather weak. It certainly was not sufficiently strong enough to keep me spellbound throughout the entire screen time of 130 minutes; drastic editing would have done wonders. Indeed, during the preview showing, many of us were finding the strain just too much and that was only halfway through! On the other hand, after the final credits of *Khan* had rolled it was difficult to comprehend how almost two hours had whipped by so rapidly. Perhaps this says more about my personal reactions to the second *Trek* film than any lengthy review could expect to offer.

Khan is, in my book anyhow, almost vintage *Star Trek.* This is *Star Trek* coming of age; the crew of the Starship *Enterprise* coming to terms with advancing years and adding much to the film's credibility as a result. One of the best running gags throughout the film, in fact, is Kirk periodically reverting to a chintzy pair of 'Ben Franklin' half-spectacles (a birthday gift from McCoy). Yet this coming of age has its darker side too. There is a certain amount of violence in *Khan* – thus persuading the censor to push the film into a category 'A' rating – that I found slightly disturbing. Not so much the violence itself, regrettably modern society tends to harden us against man's inhumanity to man (and beast), but the fact that Para-

mount felt it necessary to pander to current cinematic trends by including, for example, scenes of death and carnage in McCoy's sick bay is rather surprising. Hardly in the time-honoured tradition of *Star Trek* but, happily, other scenes tread more familiar ground. Unlike the first film, both McCoy and Spock *do* have several opportunities to renew their differences and their verbal clashes number among the several humorous, and often genuinely funny, lines in the film and not *all* of these are unintentional either.

As for the other familiar faces only Chekov (Walter Koenig) has the chance to expand his TV character. In an opening scene, he beams down to Ceti Alpha V with Captain Terrell of the USS *Reliant.* The surface of the inhospitable dust planetoid was created on Stage 8 of the Paramount Studios lot in Hollywood; a spectacular set which took several weeks to construct and took up virtually the whole of the enormous sound stage. Filming proved to be a difficult and gruelling experience for actors and film crew technicians alike.

Slung from the stage walls was a giant cyclorama depicting the atmosphere and horizon of the planetoid and the set itself comprised hills and oddly-shaped rock formations. At the end of the set, half buried in sand, were the cargo carriers from the USS *Botany Bay* that served as makeshift dwellings for Khan and his followers. In order to achieve the violent dust storms of Ceti Alpha V, huge wind and smoke machines were brought in to whip up the fine yellow sand that covered the entire stage floor. Whilst filming these scenes, the production crew were obliged to wear protective clothing, masks and goggles and both Koenig and Paul Winfield (Terrell) wore Starfleet atmosphere gear with visored helmets. During shooting on this set, director Nicholas Meyer communicated with the actors via a walkie-talkie, his instructions being related through transceivers in the specially-designed Starfleet helmets. Although the resulting scenes number among the most spectacular of the film nobody, either in the cast or among the production crew, were sorry to leave Stage 8 for the comparative calm of the *Enterprise* bridge sets.

Koenig apart, the other *Star Trek* regulars don't really enjoy much.opportunity to flesh out their roles; Sulu is still stuck at the helm, Scotty still fusses over his 'bairns' and Uhura (looking, amazingly, younger than ever) maintains her station at the communications console. Maybe they'll all be provided with a greater slice of the action in *Star Trek III* – yes, there will be another film and, doubtless, more after that. Rumours are rife that the next is *Quest for Spock* although there are no definite indications from Paramount about *that* title so far.

While I would be among the first to applaud the continuation of *Star Trek,* I can't quite see how certain members of the cast will be able to carry on their roles for many more years. To recast the characters would be unthinkable; can you imagine anyone other than William Shatner portraying Kirk? On the other hand I wouldn't derive much pleasure from seeing a grey-haired McCoy or a balding Scotty; and I doubt many fans would either – not to mention the actors themselves.

I now come, naturally enough, to the special effects developed for *Khan* which, this time, do not dominate the film completely. Yet in one sense perhaps they do for the SFX sequences are, broadly speaking, really quite outstanding.

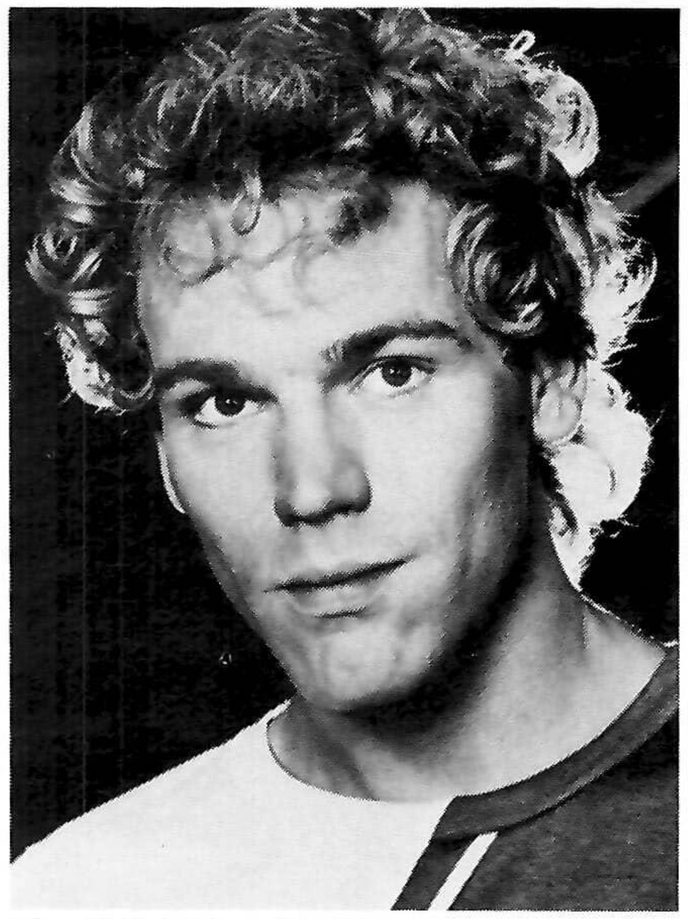
Kirstie Alley as Saavik

OK, *I* know they're using model starships, *you* know they're using model starships, but somehow with the big screen, competent opticals and the benefit of Dolby stereo, that really *could* be the *Enterprise* up there in front of us. For the finest possible effects footage Harve Bennett, executive producer, went to the best firm in the business. None other than Industrial Light and Magic, a division of **Lucasfilm, Ltd.** Responsible for the brilliant SFX of *Star Wars, Empire', Dragonslayer* and *Raiders of the Lost Ark,* who else but ILM could have produced the optical and miniature photographic wizardry necessary to realise the 23rd Century world of *Khan*?

As principal photography began on Stage 9 at Paramount Studios on November 9, 1981, the ILM special effects crew at Marin County, California, had already embarked on evolving miniature space vessels and animation effects. During the principal phase of production, an ILM camera crew, headed by effects supervisor Jim Veilleux, made regular visits to Paramount in order to photograph background plates on the set. The crew used a vintage *Vista Vision* camera (a wide-screen format which records

Ricardo Montalban as Khan

PHOTOS: © UNITED INTERNATIONAL PICTURES (UK)



Merritt Butrick as David

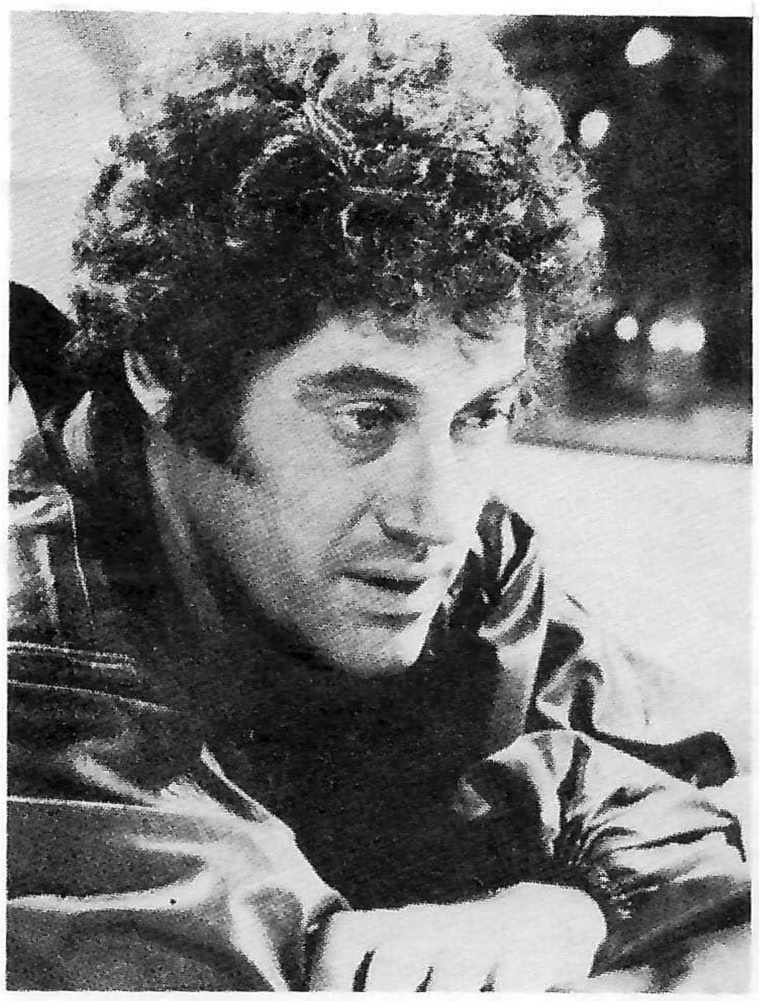
film frames horizontally, rather than vertically, resulting in a negative twice the normal size) and produced footage which was later combined with optical photography to spectacular effect.

One of ILM's major triumphs is a sequence which realises the creation of life (Project Genesis) by 'seeding' a barren planet and creating an instant, enriched, world of seas, land masses and clouds in a matter of minutes. It remains one of the SFX highlights of *Khan*, although the lush new world artificially created in the hollow centre of the dead planet Gamma Regula comes a close second. Only part of this particular set was actually constructed full-size at Paramount, the rest of the apparently immense 'world' was all ILM's doing. The scene was created through an ingenious mixture of live action stage elements, matt paintings and optical animation effects.

Towards the end of *Khan* are the exciting battle scenes between *Enterprise* and the commandeered *Reliant* which reveal, yet again, the skills of the ILM team. These scenes, skilfully edited and staged I might add, form the basis of our extensive *Star Trek* photo coverage in this issue. The two Starfleet ships battle it out over the everchanging colourful backcloth of the Mutara Nebula, each vessel dodging the other in the best tradition of old WW2 U Boat wartime dramas-shades of *Run Silent, Run Deep.* As I said earlier, vintage *Star Trek.*

Production of the film wrapped on Friday, January 29, this year after only 83 days of principal shooting – a surprisingly short time span for a big SF production – although special effects photography by ILM continued until mid-April. *The Wrath of Khan* opened in the USA on June 4 and four weeks later premiered in the West End where it quickly topped the ratings. It will be interesting to see how the new film fares in comparison with its predecessor; despite its critics I suspect it will boldly go even further than the earlier film went before . . . *

Acknowledgements
The editors of *New VOYAGER* thank Martin Goldthorpe of **United International Pictures (UK)** for assistance in providing production stills to accompany this feature.



BLAKE'S 7 EPISODE GUIDE

TERRY NATION'S POPULAR TV SERIES

THE FIRST SEASON – 1978

Episode One, 'The Way Back'. Transmitted Monday, January 2, 1978.

Former resistance leader ROJ BLAKE, his mind re-programmed by the Federation, is contacted on Earth by a new dissident group of rebels. Told of his past, and shattered to learn that his entire family were executed, he witnesses the eventual betrayal and massacre of the rebels with horror.

Blake is captured and, in a carefully-staged show trial, is tried by the Justice Computer, found guilty and exiled to the penal planet Cygnus Alpha for life. Desperate to tell what he knows, he is denied the chance to make a statement and before Blake is drugged into submission, he recognises TARRANT, the Federation agent who betrayed his companions.

Suspicious about the whole trial, Blake's defence attorney begins his own investigation. In the transportation holding pen, Blake meets the beautiful JENNA STANNIS, a space pilot and smuggler and VILA RESTAL, a highly accomplished and likeable thief.

With final evidence of Blake's innocence and the Administration's corruption in his possession, both the defence attorney and his wife are murdered by Tarrant. As the prison ship lunges away from Earth, Blake vows to return.

Blake's 7
Gareth Thomas as Blake
Sally Knyvette as Jenna
Michael Keating as Vila
Paul Darrow as Avon
David Jackson as Gan
Jan Chappell as Cally
Peter Tuddenham as Zen

Guest cast, 'The Way Back'.
Robert Beatty as Foster
Gillian Bailey as Ravella
Alan Butler as Richie
Jeremy Wilkin as Tarrant
Robert James as Ven Glynd
Peter Williams as Dr. Havant
Susan Field as Alta Morag
Margaret John as Arbiter
Rodney Figaro as Clerk of Court
Nigel Lambert as Computer Operator
Garry McDermott as Guard
Michael Halsey as Varon
Pippa Steel as Maja

Episode Two, 'Space Fall'. Transmitted Monday, January 9, 1978.

En route to Cygnus Alpha, Blake organises the convicts in an effort to commandeer the prison ship. Among them is KERR AVON a computer expert guilty of embezzling from the Federation Bank.

Whilst the revolt is being crushed the abandoned *Liberator,* a huge and magnificent alien spaceship, drifts alongside, a victim of a battle between alien forces.

LEYLAN, the prison ship commander, encouraged by RAIKER, the ship's sub-commander who smashes the rebellion, loses three members of his crew in an attempt to board the *Liberator.* In a last ditch attempt at salvage he sends Blake, Avon and Jenna into the alien vessel where Blake destroys the hallucinatory device that protects the ship. As he casts off the boarding tube between the two ships, Raiker appears, wounds Blake and is just about to kill him when Jenna and Avon get the *Liberator* moving. Raiker is plunged into the vacuum of space and the three make good their escape.

Guest Cast
Glyn Owen as Leylan
Leslie Schofield as Raiker
Norman Tipton as Artix
David Hayward as Teague
Brett Forrest as Krell
Tom Kelly as Nova
Michael McKenzie as Dainer
Bill Weston as Garton
Stuntman: Frank Maher
Magic Coach; Robert Swadling

Episode Three, 'Cygnus Alpha'. Transmitted Monday, January 16, 1978.

Blake and his companions explore the *Liberator.* One of the devices they discover is Zen, an 'n'th' generation talking computer. On a voice command from Blake, Zen sets a course for Cygnus Alpha.

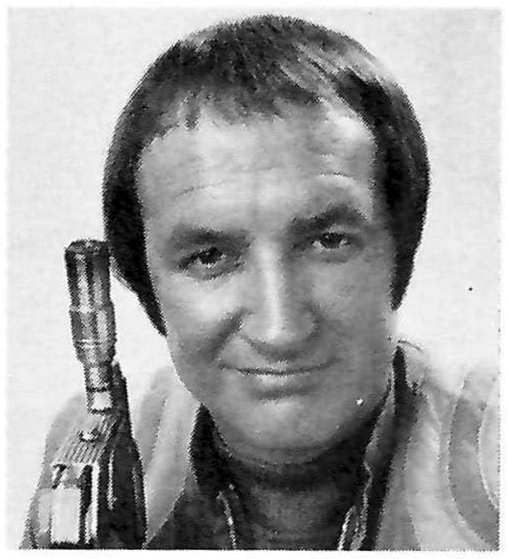
Once on the bleak planet, the space transporter *London* hurriedly offloads its passengers and lifts off. As they stumble out into the foggy darkness, the nervous prisoners are greeted by KARA, the witch priestess to VARGAS, priest ruler of Cygnus Alpha.

When the *Liberator* goes into Cygnus' orbit Blake makes a test run in the teleport transmitter. Satisfied that it can be operated successfully, he takes recall bracelets for all the prisoners and teleports down to rescue a full crew for the ship.

Blake eventually finds the prisoners locked under a crude temple suffering from a mysterious, and incurable, disease endemic to the planet; to survive they need regular doses of a drug prepared and controlled by the priests. Meanwhile, on the *Liberator,* Avon and Jenna discover a room containing an immense hoard of valuables.

Blake is captured by Vargas who, although primitive and mad, is by no means stupid. A direct descendant of the man who estab-

Roj Blake (Gareth Thomas) and the Decimas from Episode Five, 'The Web', first screened on BBC 1 on January 30, 1978.



Michael Keating played the popular character of Vila throughout all four seasons of Blake's 7.

lished the unifying religion on Cygnus, his rule is absolute. He demands the ship carry him and his followers out into the galaxy to spread the word of his divinity. He is violently angered by Blake's refusal.

On the *Liberator,* Avon is determined to take all the money and run but Jenna has a conscience. In order to solve it she decides to give Blake an hour's grace.

With time running out, Blake leads the prisoners in a last minute attempt to regain the teleport recall bracelets which Vargas has taken. In a pitched battle their only chance is to teleport up before they are overwhelmed.

As Blake yells for recall, Jenna hesitates. At the last moment to her own relief, and Avon's disgust, she hits the button. The surviving prisoners, Blake and Vargas are teleported up to the *Liberator.* Vargas, armed with Blake's gun, attempts to take over the ship. He reveals that the disease was just a mild poison and the drug merely a device for controlling the faithful. Before he can use the gun, Blake teleports him into space.

Guest Cast
Brian Blessed as Vargas
Pamela Salem as Kara
Peter Childs as Arco
David Ryall as Selman
Robert Russell as Laran
Glyn Owen as Leylan
Norman Tipton as Artix
Stunt Arranger: Peter Brayham
Stuntmen: Clifford Diggins, Del Baker, Frank Henson, Eddie Powell

Episode Four, 'Time Squad'. Transmitted Monday, January 23, 1978.
Blake determines to strike back by destroying a communications complex on the planet Saurian Major. En route, the *Liberator* captures a projectile containing three aliens in cryogenic suspension. Blake, Vila and Avon teleport onto the planet as the three are reviving.

CALLY, an Auron girl, ambushes Blake. Telepathic, she is the only survivor of indigenous guerilla forces; with her help Blake's party break into the communications complex. But guards are battering down the door as the four saboteurs work out how to explode the neutron generators; Gan and Jenna are left alone aboard the *Liberator* with the murderous aliens.

Gan tells Jenna that he has a 'limiter' implanted in his brain that makes him unable to kill. It is Gan who discovers that two of the humanoïds have left their projectile and eventually they overpower him.

Zen identifies the aliens as fanatical guardians of genetic banks contained in the locked section of the projectile. These units constitute an invasion force and Jenna comes under attack from their guardians.

Avon succeeds in triggering an explosive chain reaction with the guards almost on them, but when Blake gives the teleport command there is no response. The injured Gan struggles to the recall button and, as the guards burst in, the four are teleported up.

Blake reaches Jenna in time to save her from the guardians and Cally is accepted making the crew up to seven, including Zen.

Guest Cast
Tony Smart
Mark McBride } The aliens
Frank Henson }
Stunt Arranger: Frank Maher

Episode Five, 'The Web'. Transmitted Monday, January 30, 1978.
Blake and crew are horrified to discover that Cally has sabotaged the *Liberator.* Apparently out of control, the ship plunges through space until it is enveloped and trapped in the gossamer web surrounding a mysterious, uncharted planet. (Shades of *Star Trek's Tholian Web* episode!) While desperately trying to free the *Liberator,* Blake receives a summons, relayed through Jenna to land the ship; he teleports to the planet alone.

He finds the centuries-old survivors of an experimental project in genetic engineering. Outlawed members of Cally's people, the Auronar, they have used their powers to force Cally to bring the *Liberator* to them. They are desperately low on energy and under siege from the DECIMAS – animal machines they have created.

They offer Blake an exchange. In return for a power source they will release the *Liberator.* Blake finds out that they also intend to use the power to wipe out the Decimas. Blake decides that he cannot allow this and discovers that the people he has been talking to are not really 'people' at all . . .

Guest Cast
Richard Beale as Saymon
Ania Marson as Geela
Miles Fothergill as Novara
Deep Roy
Gilda Cohen
Izmat Hassam } The Decimas
Marcus Powell
Molly Tweedley
Willie Sheara

Episode Six, 'Seek-Locate-Destroy'. Transmitted Monday, February 6, 1978.
Blake plans a daring raid to steal the message decoder from a top security installation on the planet Centero. But all does not go entirely to plan; Cally is trapped in explosions set to conceal the theft.

On the space station which serves as Space Command Headquarters, Supreme Commander SERVALAN finds her position threatened by her failure to capture Blake. Despite opposition she appoints the fanatical Space Commander TRAVIS to track down and destroy him.

Cally survives the explosions, is taken prisoner and Travis sets a trap for Blake using Cally as bait. But Blake and Travis are old enemies and Blake anticipates his move. In a desperate race against time, Blake rescues Cally.

Obsessed by hate, and equipped with the latest Federation pursuit ships crewed by tireless Mutoids, Travis begins the long chase.

Guest Cast
Peter Craze as Prell
Jacqueline Pearce as Servalan
John Bryans as Bercol
Peter Miles as Rontane
Ian Oliver as Rai
Stephen Greif as Travis
Ian Cullen as Escon
Astley Jones as Eldon
Stuntman; Frank Maher

Episode Seven, 'Mission to Destiny'. Transmitted Monday, February 13, 1978.
The spaceship *Ortega* is orbiting helplessly when she is discovered by the crew of the *Liberator.* Teleporting, Blake, Avon and Cally find the pilot murdered, the rest of the crew unconscious and the controls severely damaged. Clearly somebody on board is responsible.

When the tranquilising gas has been cleared from the air system and the crew have recovered, their leader, DR. KENDALL, tells Blake that *Ortega* is transporting a neutrotope made from the rarest and most valuable element in the universe to her home planet of Destiny. The neutrotope will destroy a deadly fungus which is killing all plant life on the planet; without it Destiny will die.

Blake offers to take the neutrotope on the *Liberator* while Avon and Cally remain on *Ortega* to assist the crew with repairs. Kendall agrees but once Blake has left, sabotage and murder once again strike *Ortega.*

On the way to Destiny a huge meteorite storm almost destroys the *Liberator.* Checking for damage, Blake discovers that he was given an empty container and the priceless neutrotope is still on *Ortega.*

In a desperate race against time, Blake and his crew head back. Avon, meantime, has solved the puzzle only to find the murderer's accomplices are flying towards *Ortega* to collect the neutrotope and kill everyone aboard.

Guest Cast
Barry Jackson as Kendall
Beth Morris as Sara
Stephen Tate as Mandrian
Nigel Humphreys as Sonheim
Carl Forgione as Grovane
John Leeson as Pasco
Kate Coleridge as Levett
Brian Capron as Rafford
Stuart Fell as Dortmunn

Episode Eight, 'Duel'. Transmitted Monday, February 20, 1978.
When Travis's pursuit ships trap the *Liberator* near an uncharted planet, it looks like the end. With power reserves almost exhausted, Blake knows that the *Liberator* cannot withstand the continuous barrage from the Federation ships and he makes a desperate attempt to break out of orbit and ram Travis's ship.

On the planet below two aliens watch and wait. Their intervention is about to reduce the scale of the battle, but not its ferocity.

The aliens are, SINOFAR, a beautiful young woman and GIROC, a peevish old crone. Sinofar is the guardian and Giroc the Keeper. Between them they control 'The Power' – all that is left of a race which destroyed itself in 1 000 years of continuous war.

Using 'The Power' the two women hold the ships in a tractor beam and bring Blake and Travis down to the planet's surface.

Each man is given a knife and told that he must hunt and kill the other. In this way the battle will be decided without unnecessary loss of life and the victor will learn a lesson about death. (Sound familiar? Try the *Star Trek* episode, *Arena . . .)*

They are sent to a forest where each finds a companion waiting for him and as night falls the hunt begins. Travis and his Mutoid set a trap for Blake and bait it with the captured Jenna.

Blake's eventual victory, and his sparing of Travis's life, teach Sinofar and Giroc a lesson about mercy.

Guest Cast
Stephen Greif as Travis
Isla Blair as Sinofar
Patsy Smart as Giroc
Carol Royle as Mutoid

Episode Nine, 'Project Avalon'. Transmitted Monday, February 27, 1978.
Deep in the caves of an icebound planet controlled by the Federation, Travis plots a deadly plan. Code-named 'Project Avalon', the plan will bring agonising death to Blake and his crew but deliver the *Liberator* to the Federation.

AVALON is a resistance leader who has contacted Blake and asked for transportation to another planet; Travis has infiltrated the resistance, however. Once contact has made made, and Blake is on his way to the rendezvous, Avalon is captured and taken to the Security Centre.

Travis's Mutoids murder Avalon's group but when Blake and Jenna teleport down to the caves they find one member, CHEVNER, has survived. He tells them of Avalon's capture and guides them, through tunnels, to the Centre in a desperate rescue bid. Blake, Jenna, Chevner, and Vila set out on their mission.

Against all odds the rescue is successful. Back on the *Liberator* Blake realises that Travis intended that it should have been . . .

Guest Cast
Stephen Greif as Travis
Jacqueline Pearce as Servalan
Julia Vidler as Avalon
David Bailie as Chevner
Glynis Barber as Mutoid (Reappears in Season 4 as Soolin.)
John Baker as Scientist
John Rolfe as Terloc
David Sterne, Mark Holmes } Guards
Stuntmen: Stuart Fell, Cyd Child, Frank Maher

Episode Ten, 'Breakdown'. Transmitted Monday, March 6, 1978.
When Gan suddenly goes on the rampage, attacking the crew and using his great strength in an effort to destroy the *Liberator,* it is obvious that something has gone badly wrong with his 'Limiter'.

When Blake and the others eventually subdue him, analysis shows that Gan will die without immediate neuro-surgery. To achieve this, Blake must take the *Liberator* across a space zone which contains something so dangerous that Zen refuses to cooperate and aborts all computer programmes in an effort to prevent the flight. In an attempt to reach Space Research Station XK72, the only source of help for Gan, Blake decides to risk the unknown dangers of the zone. If they survive, the question still remains, will the doctors on XK72 help a wanted criminal?

Meanwhile in his death throes Gan's impulse to kill and destroy is growing stronger by the minute . . .

Guest cast
Julian Glover as Kayn
Ian Thompson as Farren
Christian Roberts as Renor
Stunt Arranger: Peter Brayham
Stuntwoman: Sue Crosland

Episode Eleven, 'Bounty'. Transmitted Monday, March 13, 1978.
To save the planet Lindor from civil war, President SARKOFF must return and re-unite his people. But a powerful Federation security force keeps him in exile on an uninhabited planet.

Blake and Cally set out to free him. While they do so, the *Liberator* answers a distress call and runs straight into trouble. Blake and Cally find Sarkoff a broken and bitter man whose only comforts are a priceless collection of 20th century Earth objects, and a beautiful servant TYCE; Sarkoff refuses to go. With Tyce's help they force him to escape with them and as the guards close in Blake finally contacts the *Liberator* and the group teleport aboard.

What Blake discovers is a trap far more deadly than the one they managed to evade on the planet.

Guest Cast
T P McKenna as Sarkoff
Carinthia West as Tyce
Marc Zuber as Tarvin
Mark York as Cheney
Derrick Branche as Amagon Guard
Stunt Arranger: Frank Maher
Stunt Driver: Stanley Hollingsworth

Episode Twelve, 'Deliverance'. Transmitted Monday, March 20, 1978.
An unidentified spacecraft crashes on the planet Cephlon. Avon, Vila, Jenna and Gan teleport down to look for survivors. They rescue a badly injured man but in the process Jenna is attacked and captured by primitive savages.

When the others go back for her they find the remains of an abandoned civilization guarded by a strange priestess. On the *Liberator* the injured man recovers sufficiently to attack Cally and hijack the ship. He forces Blake to set course for the planet Aristo where the man's father and something, or someone, called Orac are waiting. But the Federation also wants Orac.

After rescuing Jenna from the savages, Avon plays the role of a god and launches the rocket ship which will enable MEEGAT's people to start afresh on another planet.

The injured man fails to take over the *Liberator* but before he dies he arouses Blake's curiosity as to the nature of Orac and, after rescuing the others, the *Liberator* sets course for Aristo.

Guest Cast
Jacqueline Pearce as Servalan
Stephen Greif as Travis
Suzan Farmer as Meegat
Tony Caunter as Ensor
James Lister as Maryatt
Stunt Arranger: Frank Maher
Stuntmen: Terry Plummer, Terry Richards, Billy Horrigan, Chris Webb

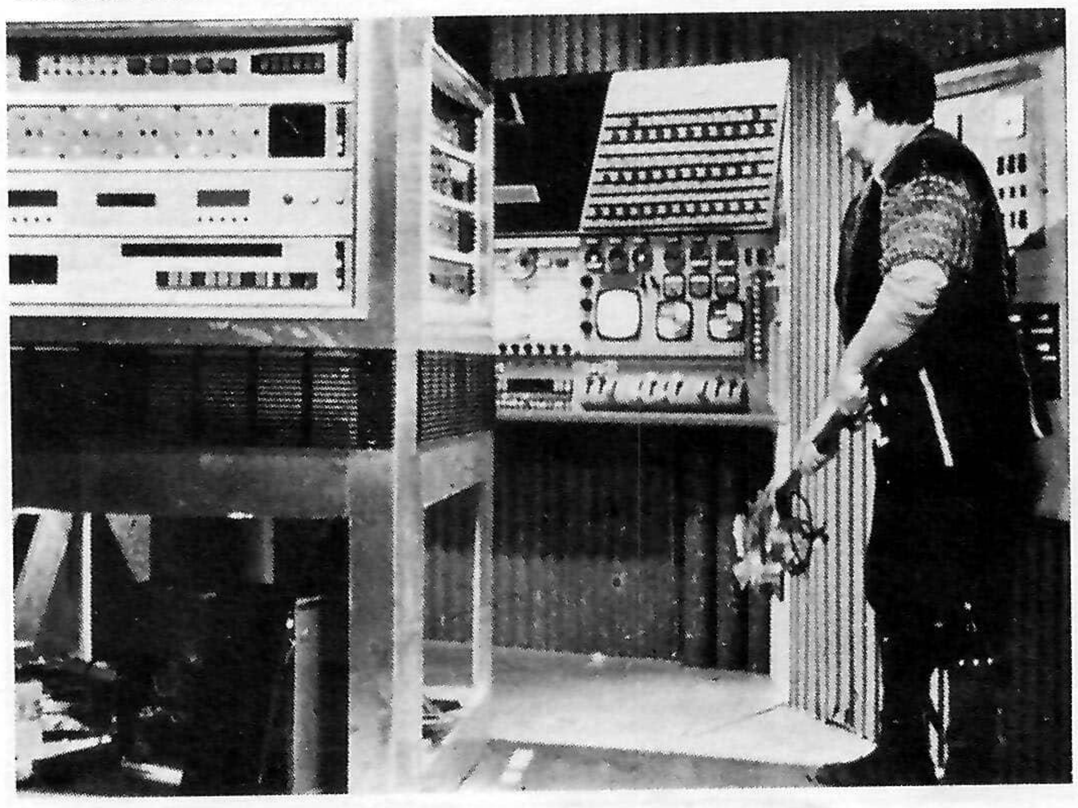
Episode Thirteen, 'Orac'. Transmitted Monday, March 23, 1978.
Blake realises that the ship which crashed on Cephlon was sabotaged by the Federation for some reason connected with Orac. He races to the planet Aristo where Orac and its creator, ENSOR, are waiting.

It is a double race, against the Federation and against time; Avon and the others who went down to the surface of Cephlon are now dying from radiation sickness. Their one hope is that medication is available on Aristo.

Blake loses the first race as Travis and Servalan reach Aristo before him . . .

Guest Cast
Stephen Greif as Travis
Jacqueline Pearce as Servalan
Derek Farr as Ensor
James Muir as 1st Phibian
Paul Kidd as 2nd Phibian
With due acknowledgements to BBC TV.

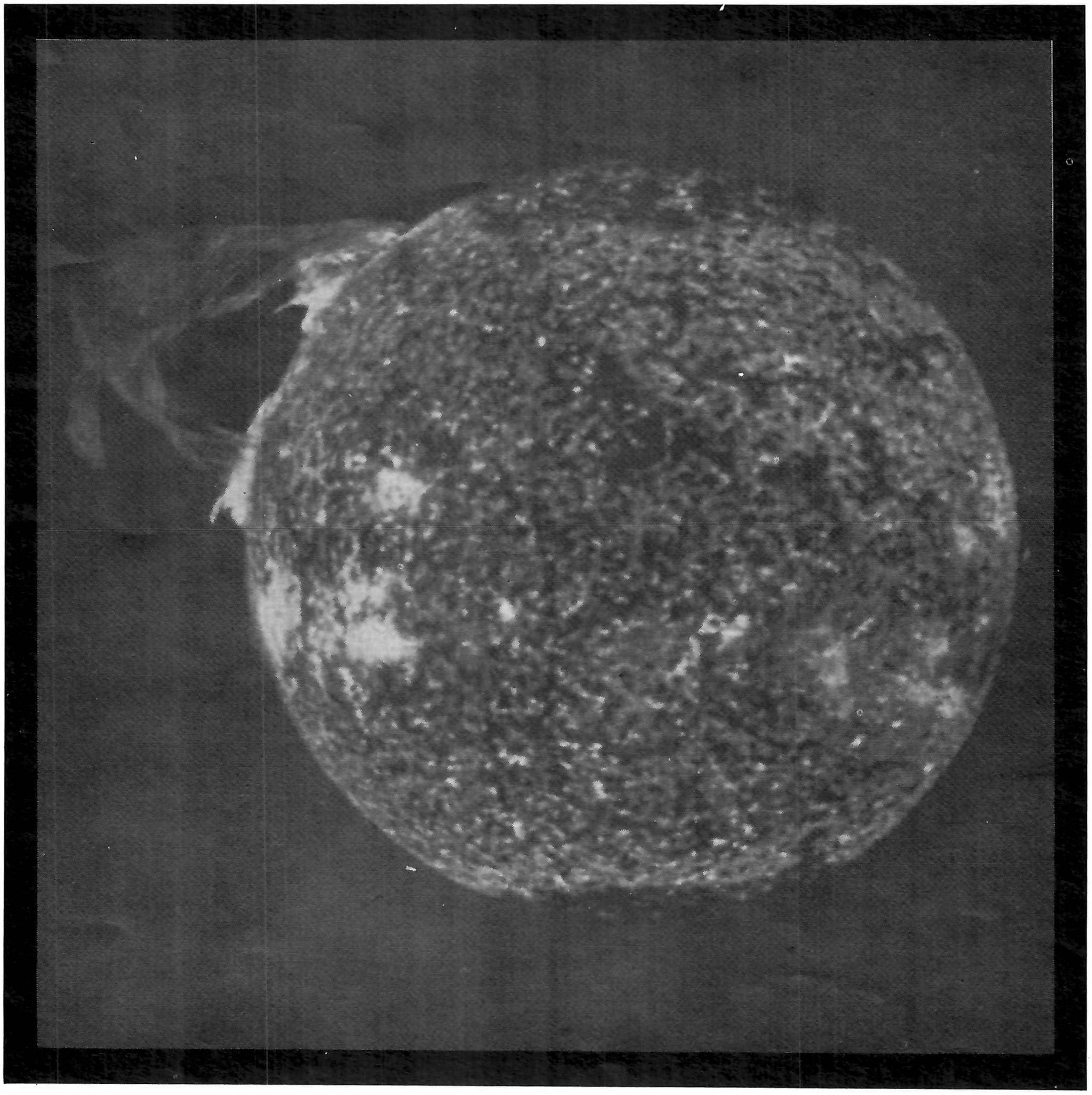
Opposite, Vila, Jenna and Blake on the flight deck of the 'Liberator' and below, Gan (David Jackson) goes on the rampage in Episode Ten, 'Breakdown'.



THE VITAL SUN

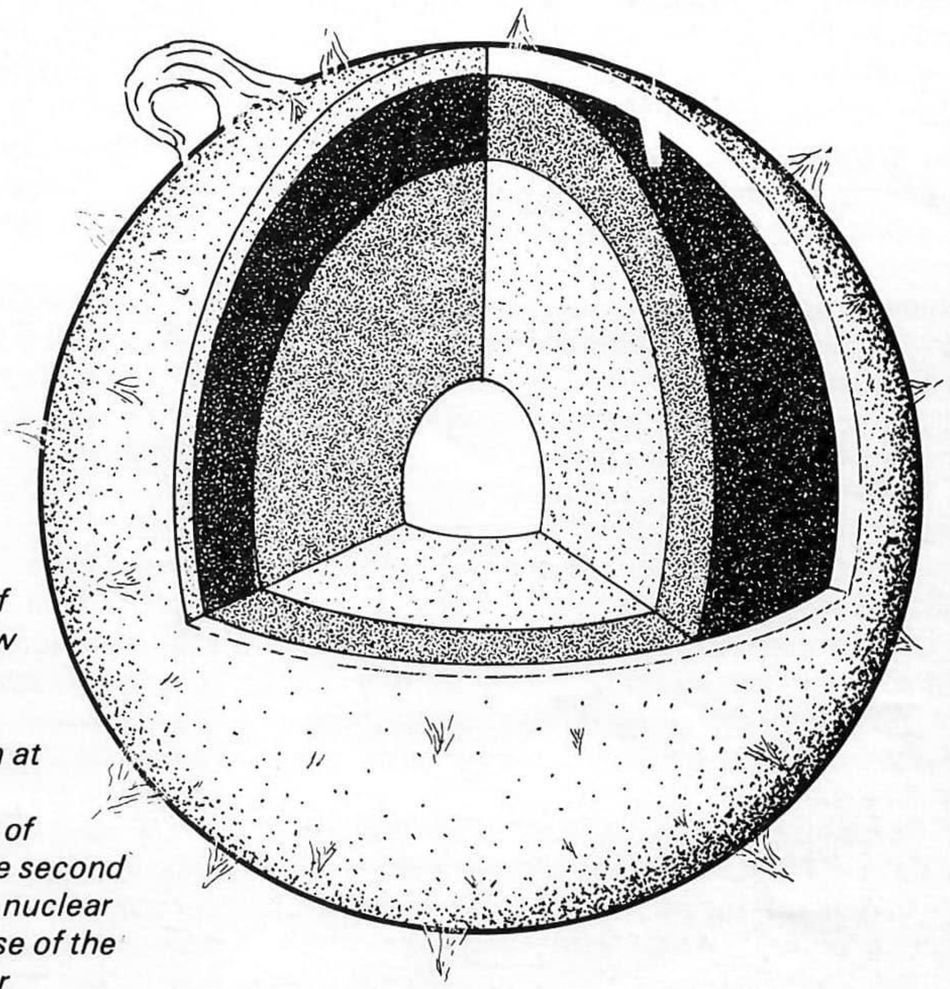
PART ONE OF IAIN NICHOLSON'S TREATISE ON OUR FASCINATING STAR

The Sun is vitally important to us. It is the source of light, heat and most forms of energy on Earth, and without the Sun we would not exist. In view of its obvious importance it is hardly surprising that most ancient peoples worshipped the Sun as a god vital to their survival. Although modern forms of 'sun worshipping' are devoted to the acquisition of all-over tans, the past decade has seen a great upsurge of interest in the Sun as astronomers attempt to understand better how it works, how its energy is produced and what links exist between fluctuations on the Sun and phenomena on Earth.

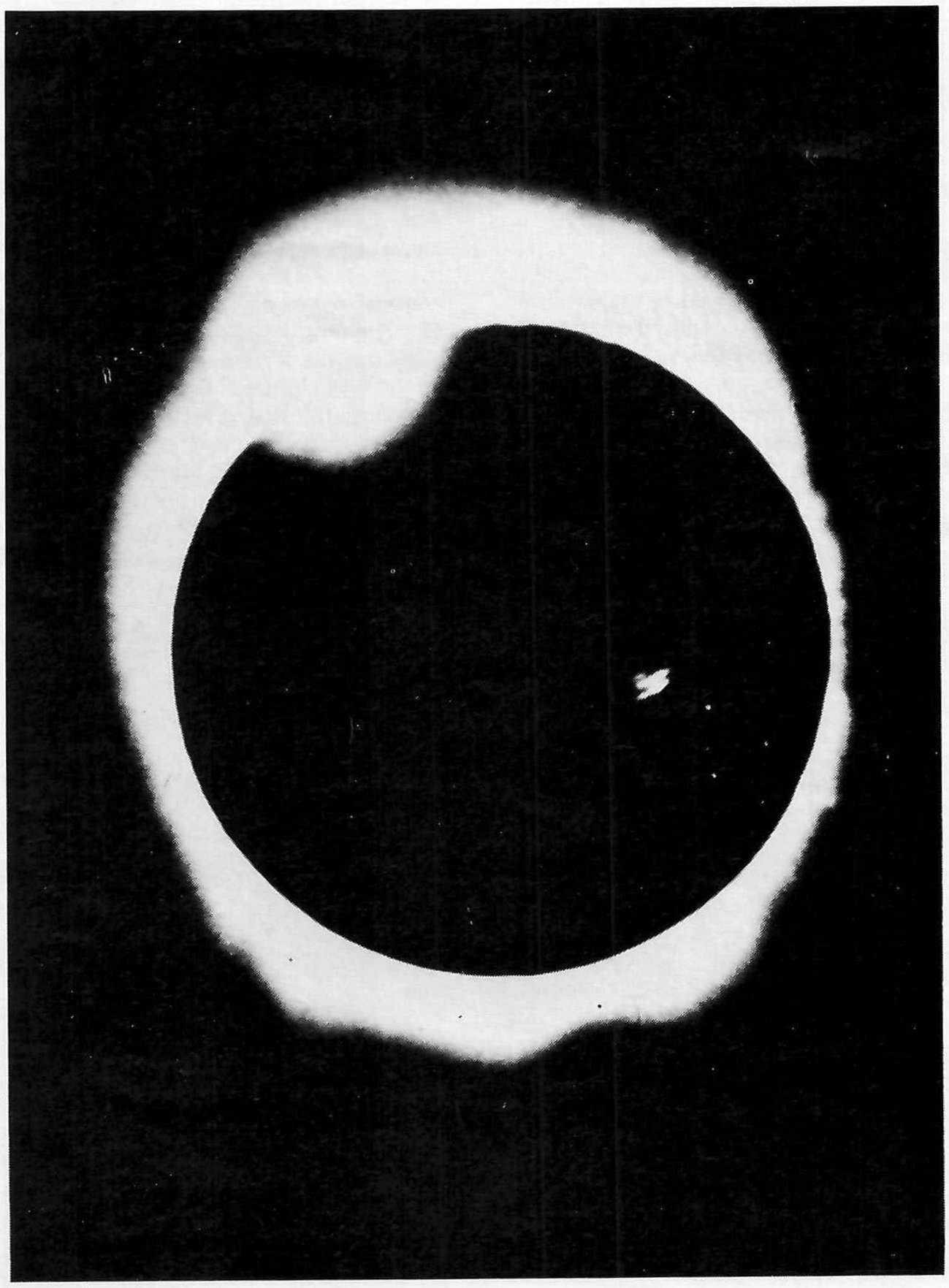


With the coming of the Space Age, astronomers have been able to study the Sun with the aid of instruments carried above the atmosphere by means of rockets, satellites and spacecraft. The atmosphere acts as a barrier to the study of the universe in general and the Sun in particular. Apart from the fact that it is cloudy for much of the time it is only transparent to certain kinds of radiation; visible light and certain frequencies of radio waves. A small fraction of the longer-than-visible infrared radiation, and a minute fraction of the shorter-than-visible ultraviolet, can penetrate to ground level, but other kinds of radiation are absorbed, or reflected, back into space by the atmosphere. While this is a very good thing from our point of view, as solar x-ray and ultraviolet radiations are extremely harmful to living creatures, from the astronomer's point of view it is very important to be able to study *all* of the Sun's radiations. Space-borne instruments have allowed him to do just that.

Most spectacular of the solar observatories have been the giant manned space station, Skylab – launched in 1973 and crewed for periods of up to 84 days by groups of three astronauts – and the unmanned Solar Maximum Mission satellite, launched in 1980. These and other missions have yielded much new information, have thrown up new puzzles to be solved and have led us to question some previously-held ideas.



Opposite, the Sun, our vital star, Photo: USN Research Laboratory. Right, artist's impression of the Sun segmented to show the central core. The solar 'powerhouse', is a comparatively small region at the star's centre where an estimated 4 000 000 tons of matter are destroyed by the second and converted to energy in nuclear reactions. Below, the eclipse of the Sun is always a spectacular phenomenon. Photo: NASA.



Our Sun

Before looking at what some of the new observations have told us, let us look at a few basic facts and figures. The Sun is a star, a self-luminous globe of gas, and – so far as we can tell – it is a very ordinary star, 'middle of the road' in terms of its size, mass, brightness temperature and chemical composition; there seems to be nothing unusual about it apart from the fact that it is very much nearer to us than any other star. The mean distance between the Sun and Earth is 149 600 000 kilometres (93 000 000 miles). Light, the fastest-moving entity in the universe, travels through space at a speed of nearly 300 000 kilometres per second, and at this speed requires just over eight minutes to reach us from the Sun. By way of comparison light takes nearly 4·3 *years* to reach us from Proxima Centauri, the nearest star apart from the Sun. In effect, Proxma Centauri is roughly a quarter of a million times further away.

With a diameter of 1·4 000 000 kilometres (865 000 miles) it is over 100 times larger than Earth. Its mass is about 330 000 times that of our planet (in other words, if you could place the Sun on one side of a giant pair of scales, 33 0000 Earths would be required on the other side to achieve a balance) but since the Sun's globe is large enough to contain well over a million Earths, it is clear that the Sun's material must be considerably less dense than that making up Earth. This is hardly surprising, for the Sun is made up mainly of the two lightest chemical elements, hydrogen and helium, whereas Earth is composed of rocks and metals.

The visible surface, which is known as the *photosphere,* has a temperature of nearly 6000 degrees Centigrade, but in the central core – deep in the Sun's interior – the temperature is believed to be over 14 000 000 degrees. Above the photosphere lies the *chromosphere,* a layer of atmosphere a

few thousand kilometres thick, and above this, the very rarefied outer atmosphere of the Sun, known as the *corona.* The chromosphere and corona can be seen directly from Earth only during a total eclipse, when the Moon passes exactly between us and the Sun, and the brilliant photosphere is blocked from view. Although astronomers can use specialised instruments (based on spectroscopes and filters) to study the chromosphere at any time, and can use the coronagraph from high mountain sites to examine the inner parts of the corona, the whole solar atmosphere can be studied far better from space.

There is some dispute over who first used a telescope to study the Sun, but credit is usually given to the great Italian astronomer Galileo who did so in 1610. One of his first discoveries was the existence of sunspots, dark patches on the solar surface; by studying their shifting positions from day to day he was able to show that the Sun spins on its axis in a period of about a month.

Sunspots are not really 'dark' at all. They are regions of the solar surface which are cooler than the rest of the photosphere – the central part (or 'umbra') of a sunspot being at a temperature of about 4000°C compared to the 6 000°C of the photosphere – and so emit rather less light and appear dark by contrast with their surroundings. Sunspots are associated with powerful concentrated magnetic fields about 10 000 times stronger than the Earth's magnetic field. They usually occur in pairs or groups, one member of each pair acting as a north magnetic pole and the other as a south magnetic pole just as if there were a bar magnet buried under the solar surface between the two spots.

The number of sunspots varies in a cyclic way, reaching a maximum every 11 years or so. Around each maximum the face of the Sun is heavily spotted, but at minimum the Sun may be completely devoid of spots for weeks at a time. Other aspects of solar activity increase and decrease, in step with the sunspot cycle.

The most beautiful of solar phenomena are the prominences, flame-like clouds of relatively dense hot gas in the upper chromosphere and lower corona. Some of them, the *quiescent* prominences, are long-lived features which hang suspended sometimes for many months on end, others take the form of loops, their material flowing along the magnetic lines of force above active regions (such as a sunspot group). The most violently active prominences hurl material to heights of several 100 000 kilometres; in some cases material is ejected from the Sun altogether.

The most violent events are *flares,* explosive eruptions which usually occur in the vicinity of complex sunspot groups. Energy stored in the warped and twisted magnetic field is suddenly released, (no-one knows for sure how it happens) atomic particles are blasted forth, some of them at speeds approaching the speed of light, shock waves surge through the solar atmosphere and across the surface, and all kinds of radiation from gamma- and x-rays to radio waves are emitted. Those particles and radiations which reach Earth cause important effects.

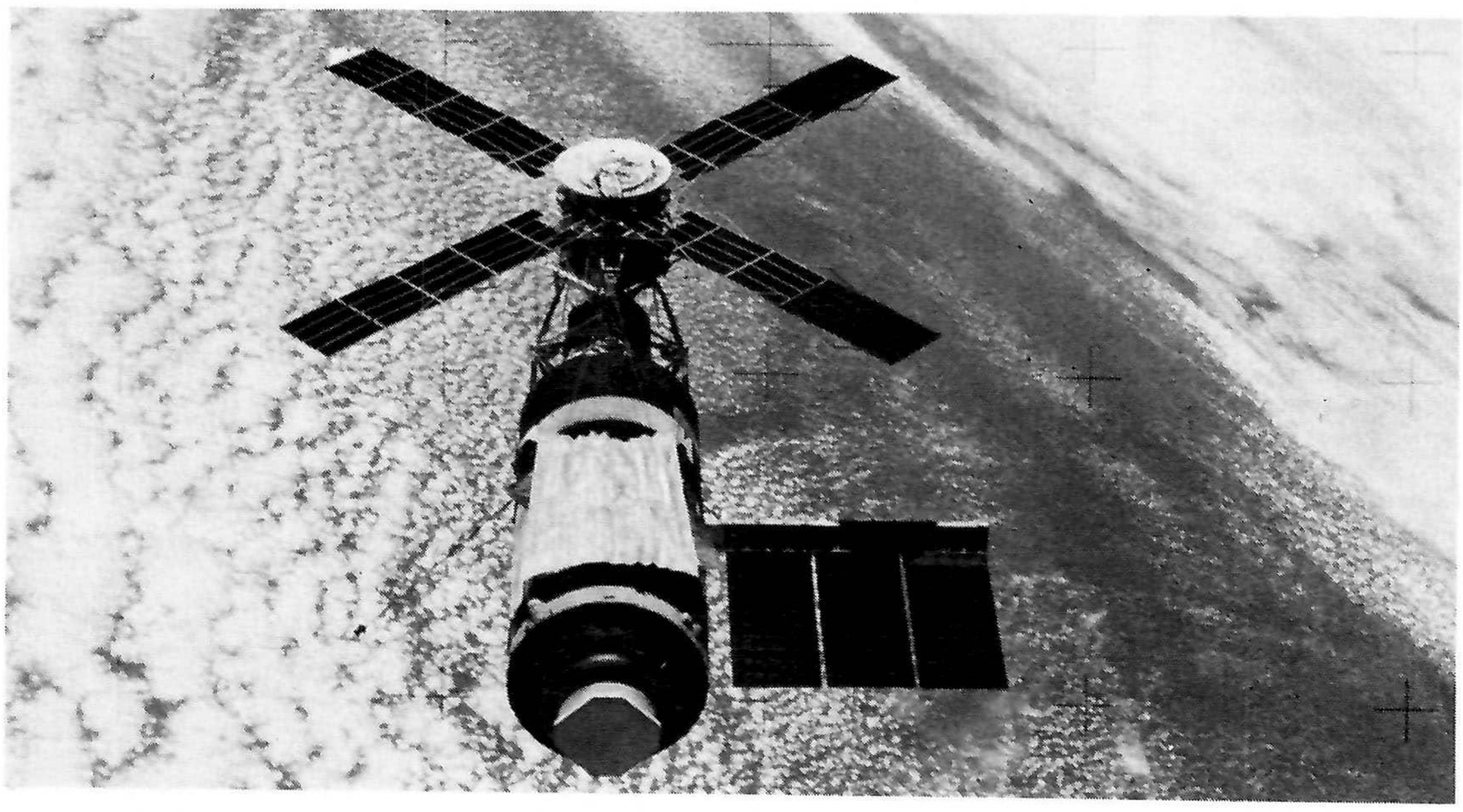
Ultraviolet and x-ray observations have shown us that the corona is much more complex than originally had been thought. Although it has a very high temperature (well over 1 000 000°C) the corona is so rarefied that the amount of visible light which it emits is only about one millionth of the amount given out by the photosphere, and it is not surprising, therefore, that the corona can only be seen when the photosphere is eclipsed. The photosphere at a temperature of around 6000°C, emits most strongly at the wavelength of visible light, but the corona is at such a high temperature that it emits x-rays. At x-ray wavelengths the corona is the 'brightest' feature and it can easily be seen right across the face of the Sun since the photosphere is too cool to emit x-rays and, therefore, appears dark in x-ray photographs. X-ray observations show that the corona is uneven and lumpy and contains hot dense active regions with temperatures of up to 5 000 000°C, less dense and cooler 'quiet' regions, and dark, low-density regions called *coronal holes;* holes in the solar atmosphere out of which streams of atomic particles pour into interplanetary space.

The particles which leak away from the Sun make up the *solar wind,* an irregular gusty stream of electrons, protons and other particles which flows past the planets, passing Earth at speeds of about 400 kilometres per second. Some of these particles become trapped by earth's magnetic field to form radiation belts – the Van Allen zones – high above the atmosphere. Around our planet is a region of space called the *magnetosphere* within which Earth's magnetic field is stronger than the interplanetary magnetic field. The solar wind squeezes the magnetosphere on the side facing the Sun and draws it out into a long tail on the other. Fluctuations in the solar wind, or violent blasts of particles from solar flares, squeeze the magnetosphere to such an extent that disturbances known as *magnetic storms* can be felt in Earth's magnetic field at ground level. Atomic particles entering the atmosphere, which they can do most easily in polar regions, cause atoms in the upper atmosphere to emit light in beautiful coloured patterns we know as the aurora.

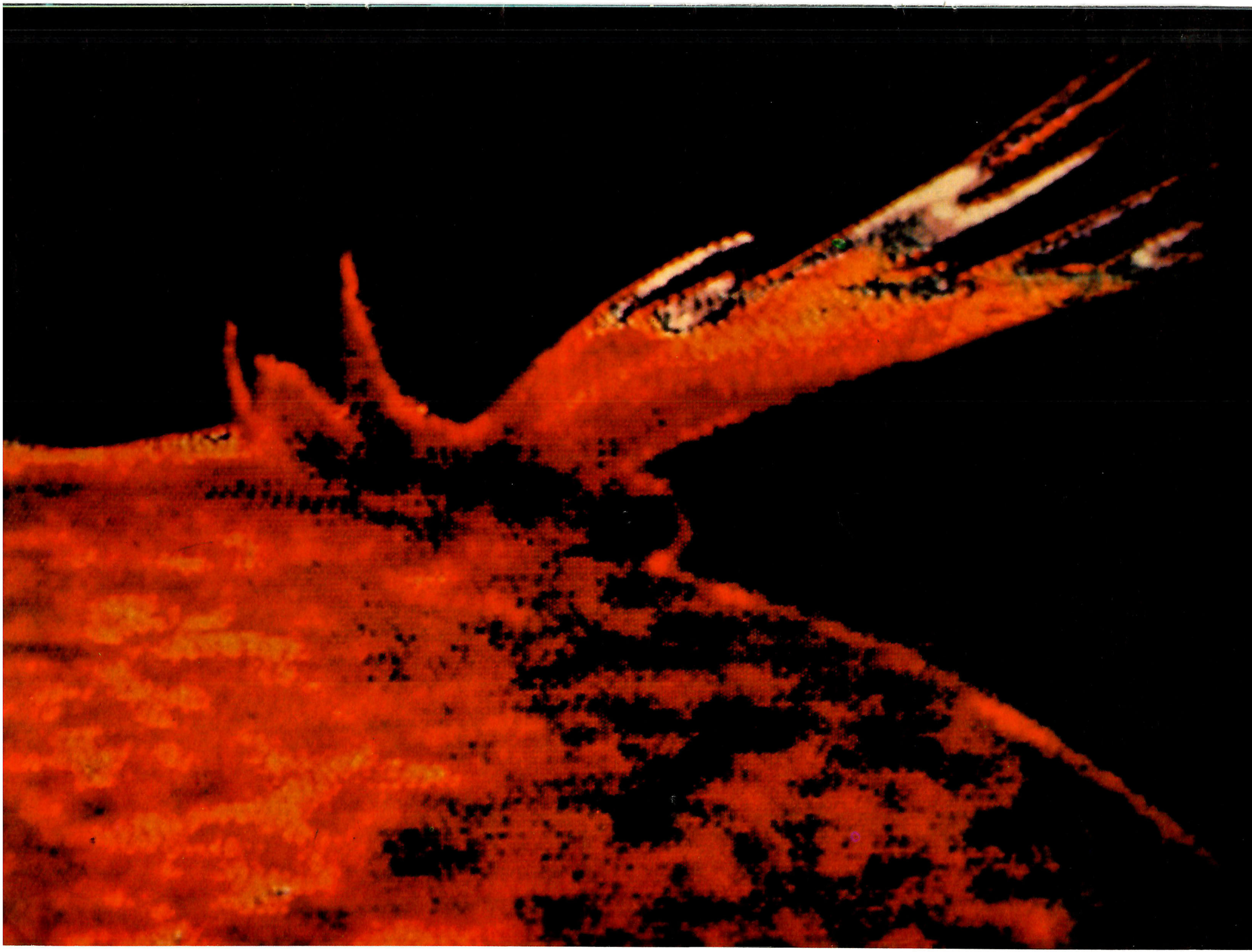
Solar x-ray and ultraviolet radiation cause ionisation in the upper atmosphere; *ie,* electrons are knocked from atoms to provide those electrically charged atmospheric layers – known as the ionosphere – from which radio waves may be bounced in order to communicate round the globe. Sudden increases in this radiation, such as the blast of x-rays emitted by a solar flare, cause drastic change in the ionosphere with resultant fade-outs and interference with radio communications. The frequency of events like these, and of magnetic storms and displays of the aurora, is closely linked to the state of the sunspot cycle. *(To be concluded).*

PUBLISHERS' NOTE

NEVER look at the Sun through a telescope or binoculars. Serious and irreparable eye damage, and quite probably permanent blindness, would be caused by the concentrated heat and light. It is dangerous to stare at the Sun even without a telescope. BE WARNED!



Skylab photographed from the Skylab 4 Command and Service Modules (CSM) crewed by Astronaut Gerald P Carr, Commander; Scientist Astronaut Edward G Gibson, science pilot; and Astronaut William R Pogue, pilot. Much useful data on the Sun was collected by the crews of Skylab. Photo: NASA.



SHUTTLE UPDATE

MAT IRVINE REPORTS ON 'COLUMBIA' AND 'CHALLENGER'

STS-4, the fourth Shuttle test flight, came and went with hardly a murmer from the media. Shades of the final Apollo flights when it took the Apollo 13 accident to bring it all back into the news. Of course, most space launches hardly merit a mention these days for there are so many of them.

The fourth Shuttle proving flight lifted off on June 27 with astronauts Thomas Mattingly and Henry Hartsfield aboard. It was the last of the test missions and the first to carry a military payload. It was also the first launch that didn't use any extra hold time on the pad and *Columbia* lifted off to the second of its scheduled time.

In all, the flight went perfectly although during the initial stages of the lift-off, the SRBs did not burn completely as planned and resulted in the Orbiter heading for a lower-than-ideal orbit. The difference was made up by the main shuttle engines, the SSMEs, burning for longer. This wasn't the end of the SRBs making news for instead of being recovered, as planned, something happened to the parachutes and both SRBs sank in 600 fathoms.

In orbit the astronauts could pay attention to their cargo and, for the first time, had to deal with a Department of Defense payload which included a Space Sextant, developed by Martin Marietta, designed to be completely independent of anything on the Earth for charting the craft's position. There was also apparent trouble with some of the mechanics on this military payload. This wasn't helped by the fact that the astronauts, according to the July 5 issue of *Aviation Week and Space Technology,* had problems communicating with the ground and the payload communicator at the Air Force Satellite Facility. This was because all the talk had to be in code 'for security reasons' and the transmissions got so esoteric at times neither side could understand the other. Obviously there is a moral in that somewhere!

The flight ended on July 4, when *Columbia* touched down at Edwards' AirForce Base using, for the first time, a proper runway instead of the dry lake beds of the first three flights. This now clears the way for the Shuttle to return to its launch-site at KSC and its concrete runway. This is planned for STS-7, but could well be earlier.

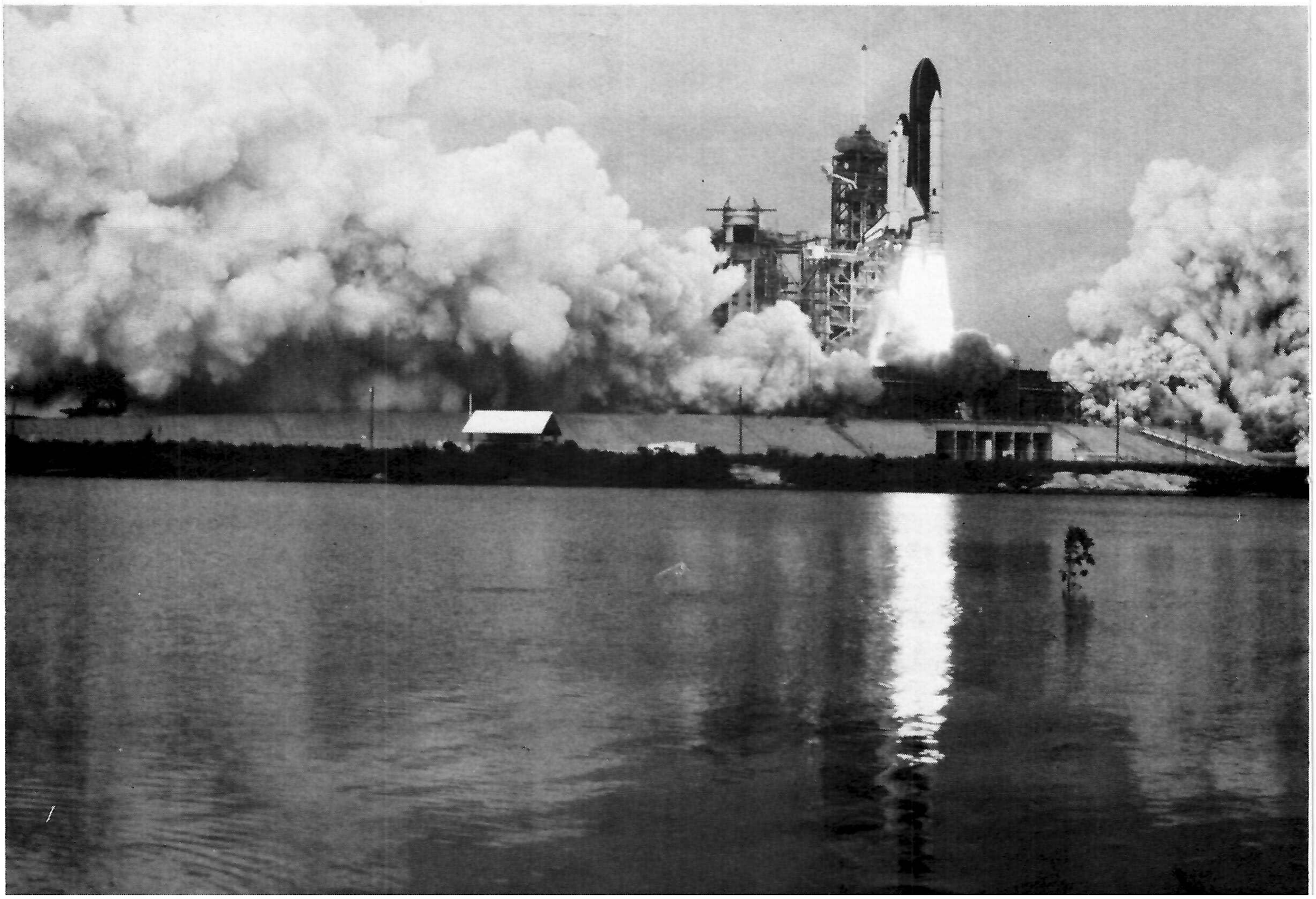
Shuttle – the future

From STS-5, the Shuttle will be flying as a commercial load carrier. NASA have flights planned well into 1987 involving 60 more flights from KSC, and eight from Vandenburg starting in 1985. The sixth flight, STS-6, will be the first for Orbiter 099, *Challenger,* which will carry the giant comsat TDRS – Tracking and Data Relay Satellite. This is designed for multi-communication coverage of many NASA space missions, including that of the Shuttle itself. TDRS will be placed in geostationary orbit, the Clarke orbit, by an IUS (Inertial Upper Stage) and is planned for next January.

STS-7, also *Challenger,* launches Palapa, a comsat for Indonesia, plus three other loads and is planned for April, 1983.

STS-8, *Challenger* and the second TDRS, plus INSAT 1-B, a comsat and meteorological satellite for India's Department of Science takes off in July, 1983.

STS-9, *Columbia* and the first flight of a Spacelab Workshop and Pallet (Pallets only flew on STS-2 and 3.) This is scheduled for



September, 1983 and the crew will number six, the most to date, and the mission is due to last seven days.

STS-10, *Challenger,* due in November, 1983, and the first exclusive Department of Defense payload, with the code number DOD 84-1, but further details are decidedly hazy!

STS-11, *Columbia,* is due for flight in January, 1984. This will carry the second Palapa satellite, and the large format camera.

STS-12, in March 1984, will be the first flight of the third Orbiter, OV-103 *Discovery.* The payload will be the third Tracking and Data Relay Satellite and also the MEA payload – Materials' Experiment Assembly. This is a self-contained facility designed for experiments in material processing using techniques only available in orbit, such as free-fall conditions and a perfect vacuum.

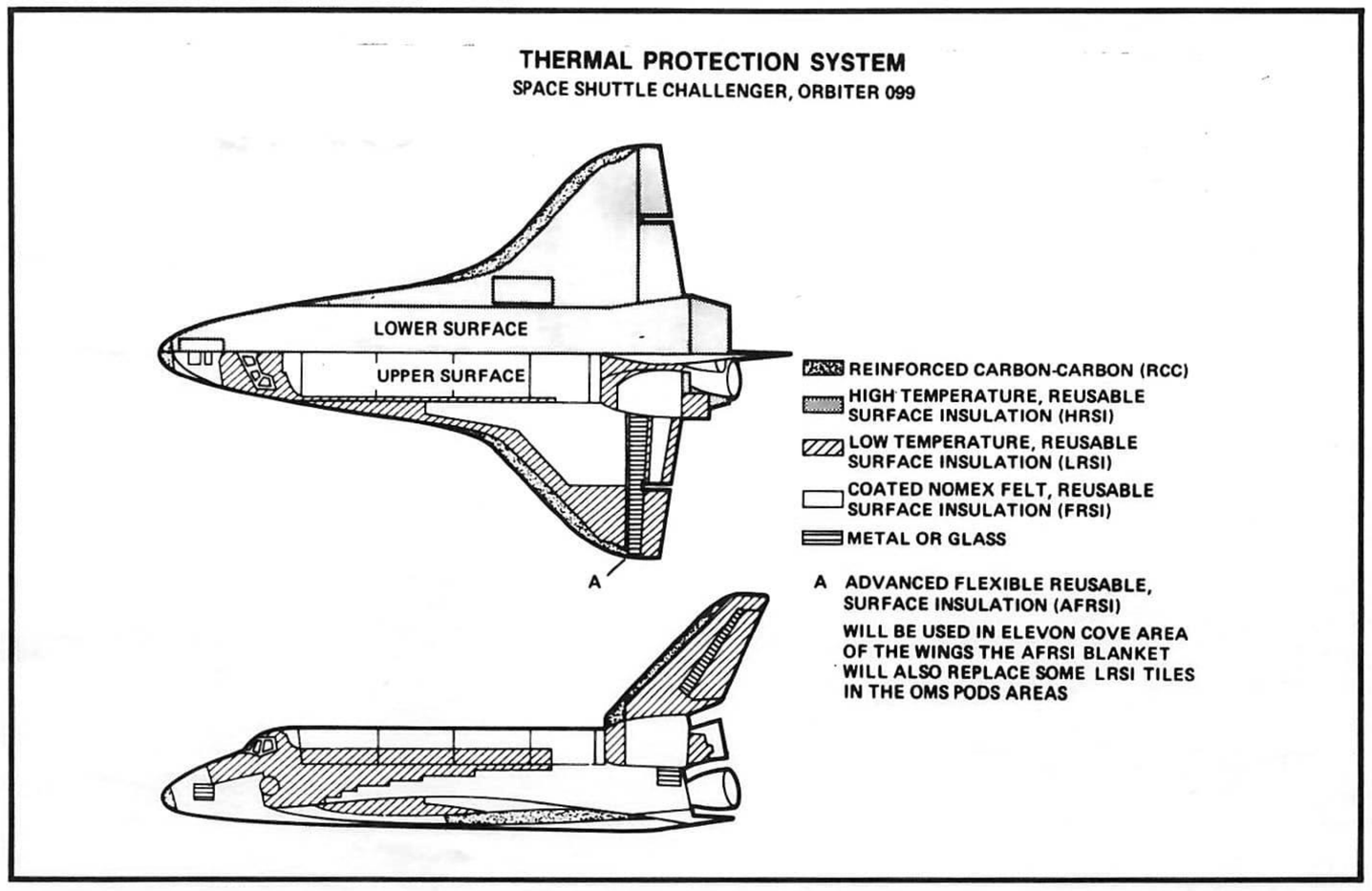
Details on further flights will be covered in future issues, although it should be noted that payloads and launch dates are not finalised and subject to change.

Shuttle snippets

While *Columbia* sat on the pad waiting for her fourth trip into space, she was pelted by hailstones. Over ten inches of rain fell on the pad during the month *Columbia* was in position, culminating in a hailstorm the day before the launch. An estimated total of 400 dents were made in the tiles of the right elevon, the tail flap and the rudder. About half were filled before the flight, although it was said that the launch could have gone ahead without this attention to *Columbia*'s skin.

Yet another type of thermal insulation is being added to the Shuttle Orbiters' patchwork of tiles. This is a silica glass quilt, delighting in the name of Advanced Flexible Reusable Surface Insulation, or AFRSI for short. It is initially being fitted to the area immediately in front of the elevons. On the next Orbiter, 099 *Challenger,* the AFRSI is being fitted to areas on the OMS (Orbital Manoeuvring System) pods, either side of the tail.

The first operational flight of the Space Shuttle, mission STS-5, is scheduled for lift-off from the Kennedy Space Center on November 11. For the first time a crew of four will be carried. The commander will be Vance Brand and the pilot, Robert Overmyer. Two payload mission specials are also carried, Joseph Allen and William Lenoir. The payload will be a commercial load of two communications satellites – Satellite Business Systems' SBS-C and the Canadian domestic comsat, Telesat E. Being comsats they will, of course, have to be propelled into geosynchronous orbit. This will be accomplished by the Solid Spinning Upper Stage. The mission is due to last five days. *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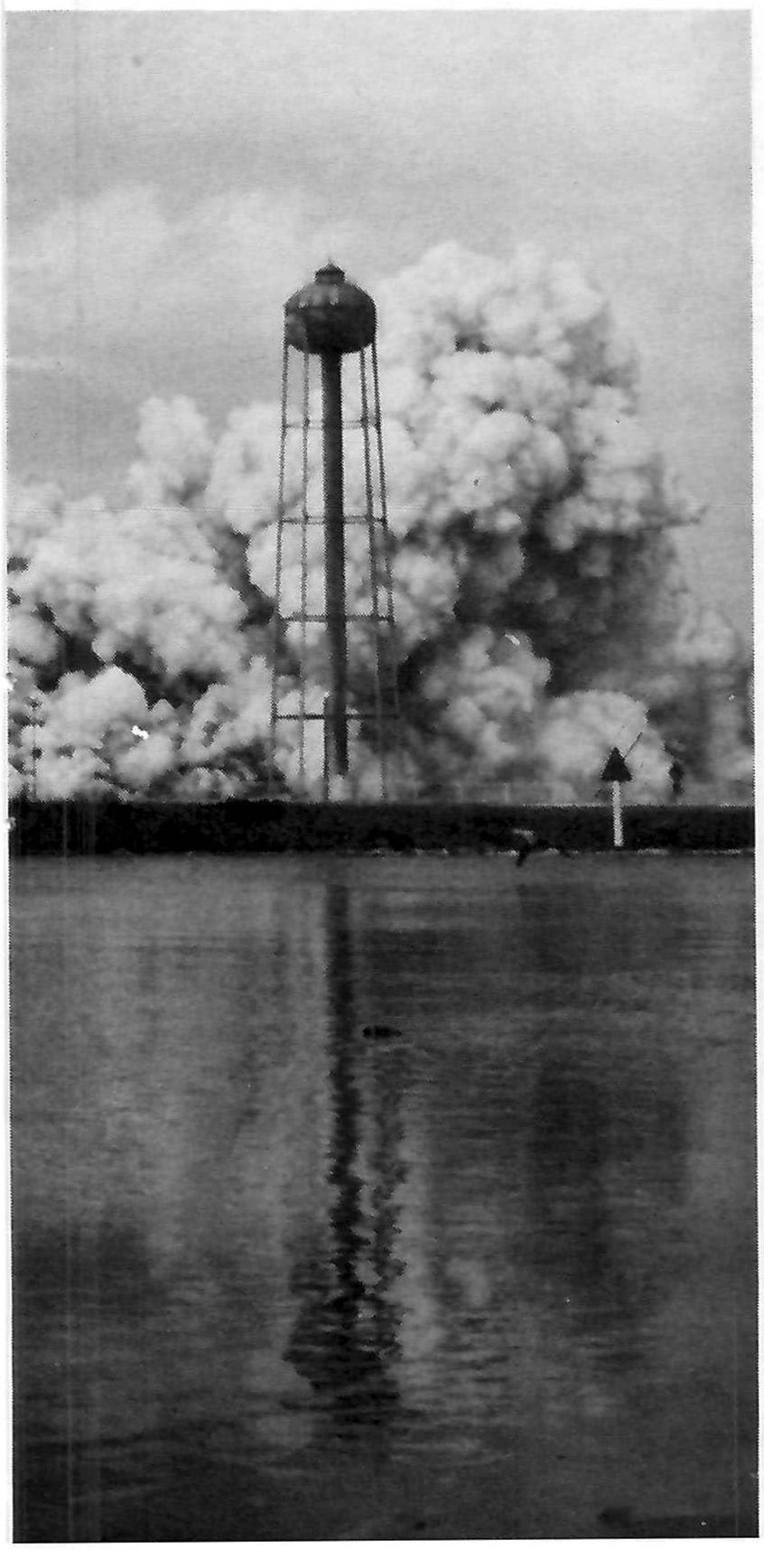
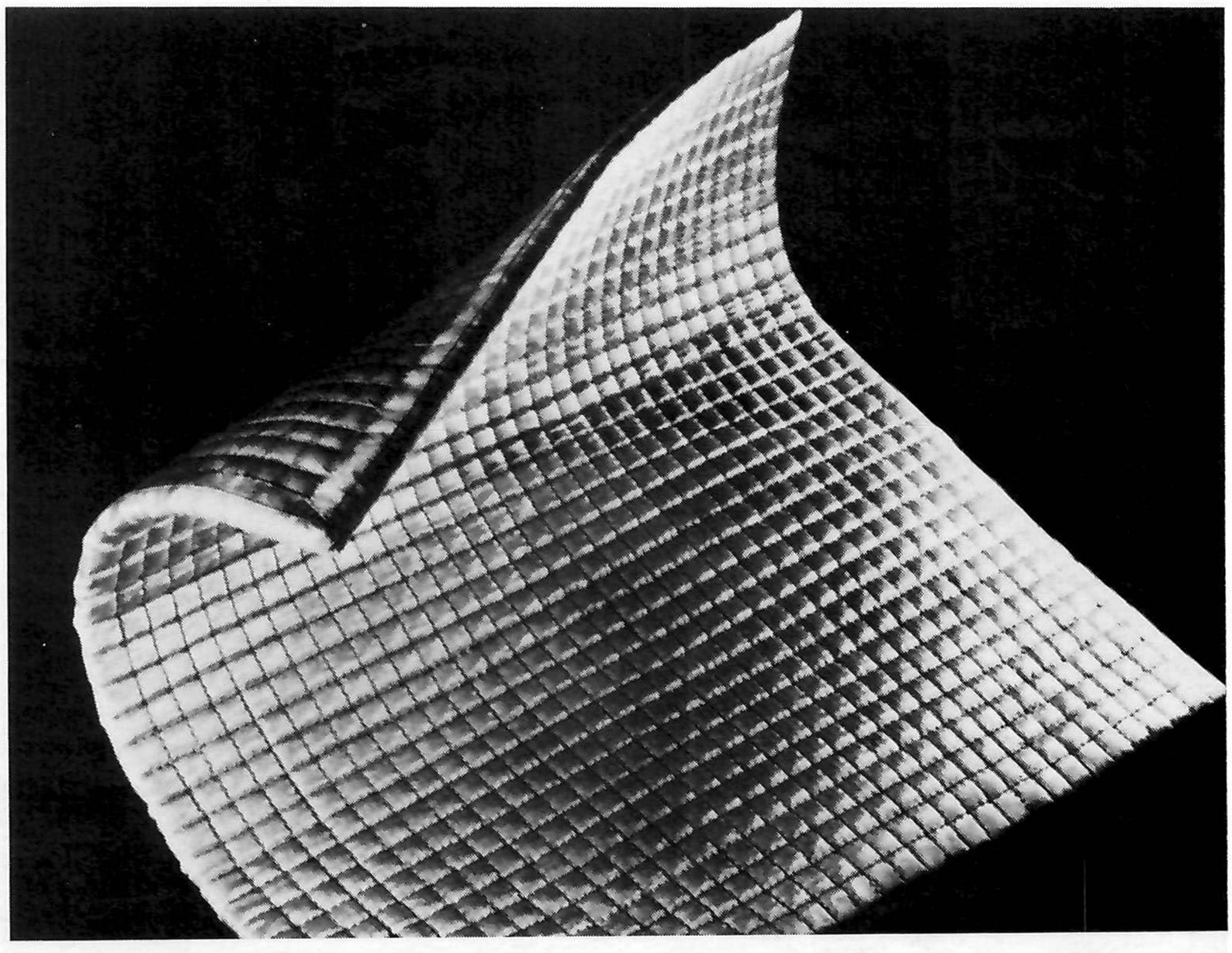
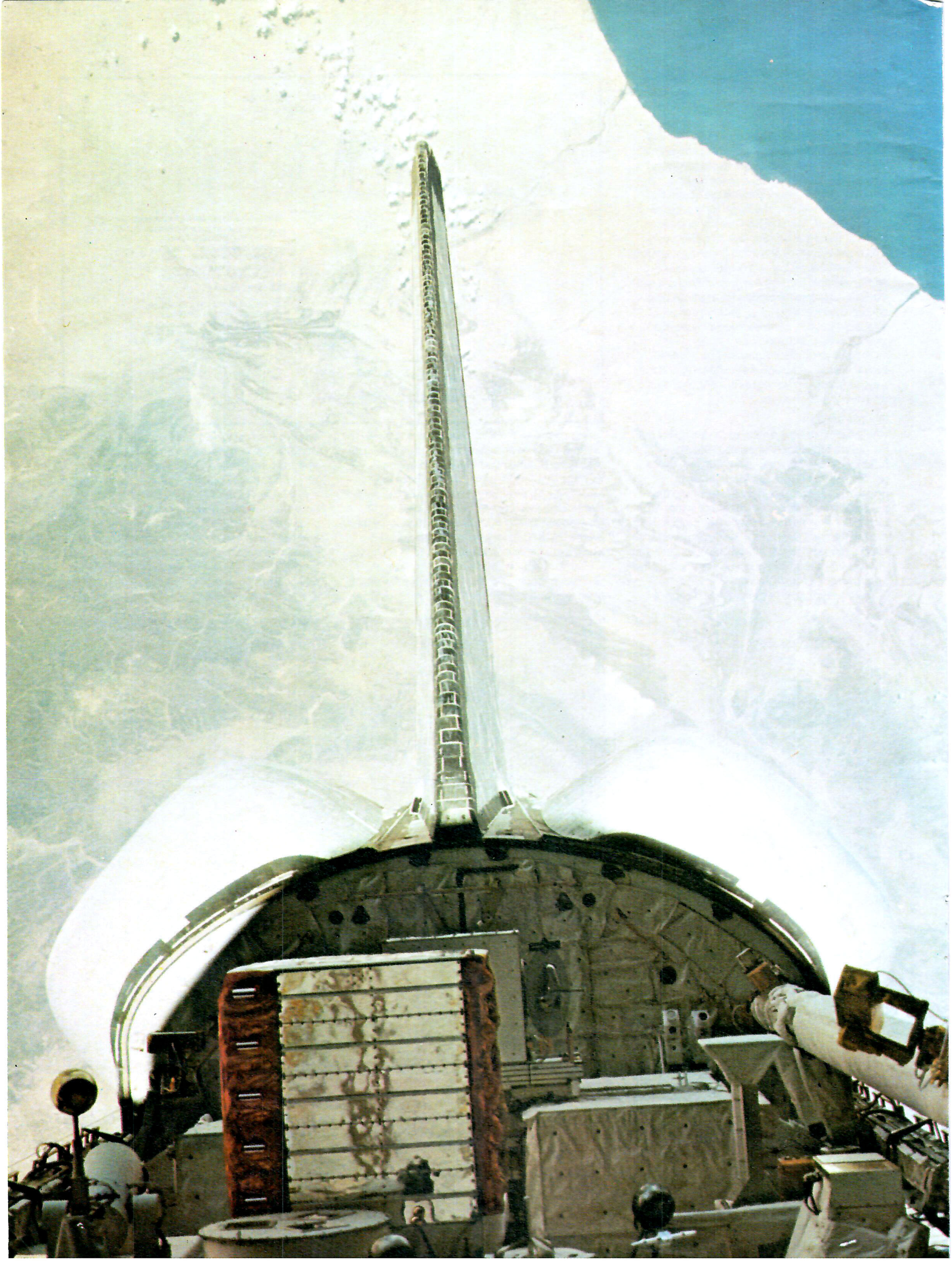
HIGH TEMPERATURE, REUSABLE SURFACE INSULATION (HRSI)
LOW TEMPERATURE, REUSABLE SURFACE INSULATION (LRSI)
COATED NOMEX FELT, REUSABLE SURFACE INSULATION (FRSI)
METAL OR GLASS
A ADVANCED FLEXIBLE REUSABLE, SURFACE INSULATION (AFRSI)
WILL BE USED IN ELEVON COVE AREA OF THE WINGS THE AFRSI BLANKET WILL ALSO REPLACE SOME LRSI TILES IN THE OMS PODS AREAS





Left, lift off! 'Columbia' blasts off the pad for STS-3 earlier this year in March. Photo: Rockwell International via Joe Daileda. Above, the re-designed TPS location for Orbiter 099, the 'Challenger' and, above, the latest thermal protection material for 'Columbia' is a silica glass quilt – AFRSI-described in the text. Photos: NASA.



Opposite page, Morocco's Atlantic Coast and some inland areas – formerly Spanish Sahara – provide the backdrop for Columbia *during STS-3. The normally active manipulator arm is at rest and many components making up the Office of Space Sciences (OSS-1) package are seen at lower centre. The picture was taken through the aft flight window with a hand-held camera. Photo: NASA.*
Below, STS-3 awaits the green light. Crewed by Jack Lousma (commander) and Gordon Fullerton (pilot) Columbia *blasted off the pad on March 22, earlier this year. At left, the spacecraft returns to Northrup Strip at the White Sands Missile Range, on March 30, after eight days in orbit. Photos: NASA via Joe Daileda.*

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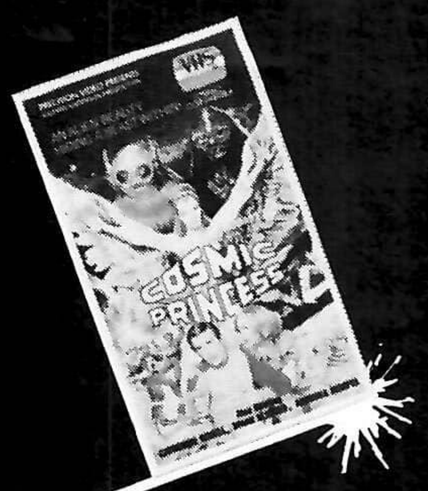

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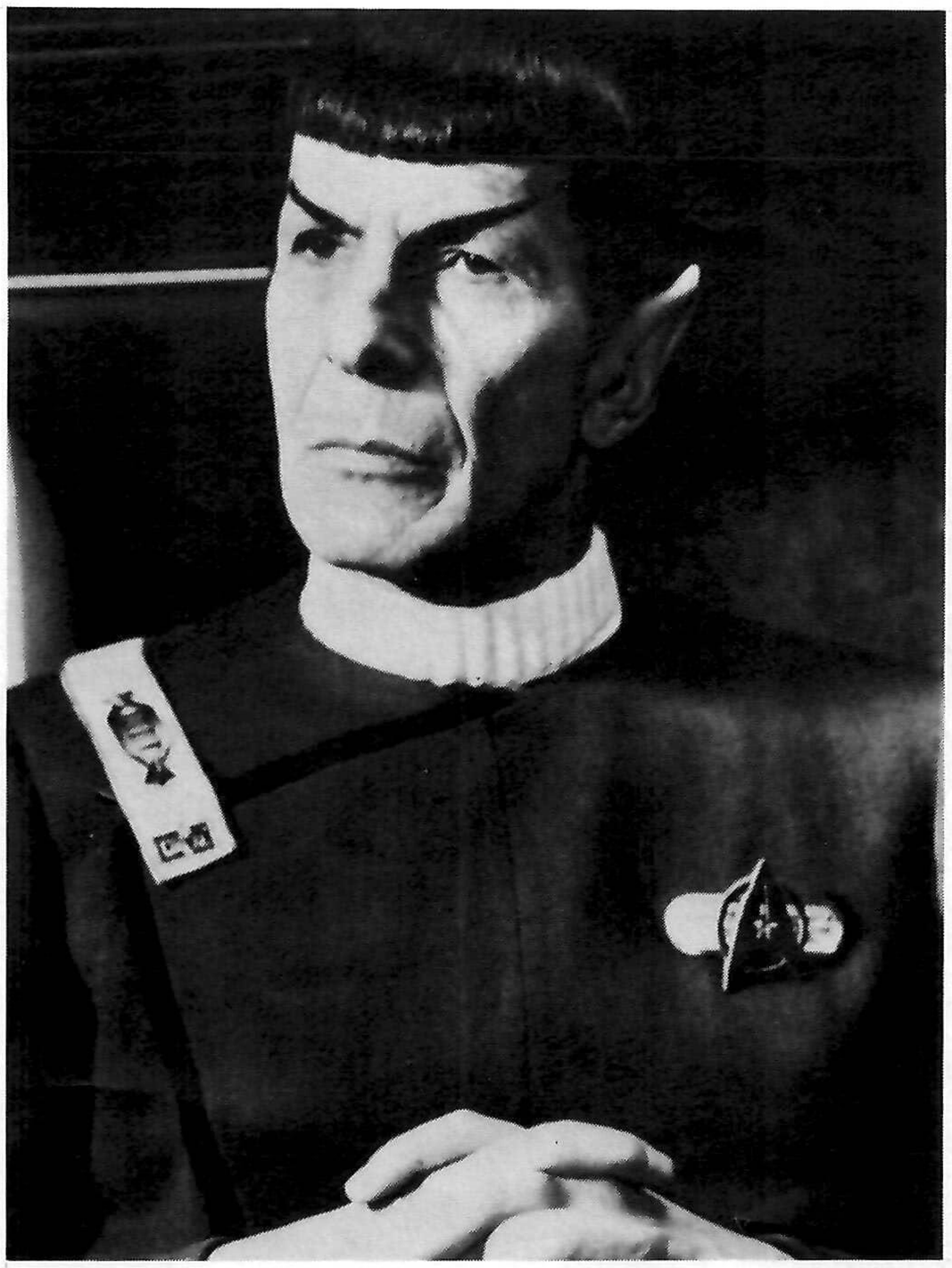
THIS ISSUE'S SPECIAL PULL-OUT. STAR TREK II: THE WRATH OF KHAN

This issue's special colour pull-out (overleaf) features the Starship *Enterprise* battling it out with USS *Reliant* in the Matura Nebula towards the climax of 'The Wrath of Khan'. All 'Star Trek' photos (colour and black and white) are reproduced in this issue by courtesy of **United International Pictures, (UK).**



Star Trek II. The Wrath of Kahn
A Paramount Picture. Distributed by United International Pictures. Certificate 'A'
Length: 10 515 feet
Running time: 113 minutes

Main Cast			
Kirk	William Shatner	Terrell	Paul Winfield
Spock	Leonard Nimoy	Saavik	Kirstie Alley
McCoy	DeForest Kelley	Khan	Ricardo Montalban
Scotty	James Doohan		
Chekov	Walter Koenig	**Production**	
Sulu	George Takei	Director	Nicholas Meyer
Uhura	Nichelle Nichols	Producer	Robert Sallis
Carol	Bibi Besch	Screenplay	Jack B Sowards
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ELECTRONIC GAMES

BETTER THAN EVER!

GRAHAM HALES LOOKS AT THE EXCITING WORLD OF HAND HELD GAMES.

The fourth generation of electronic hand-held games has now arrived. Today's games are better, more challenging, and offer a far greater degree of sophistication than their predecessors thanks to technological advances made possible by the silicon chip.

The successful hand-held games are the ones based on the firm arcade favourites. To succeed they must reproduce the arcade format, colours, sound effects and, most important of all, the degree of challenge and difficulty of the full-size machine. Also, a variety of skill levels is essential to enable the good player to advance onto a progressively more difficult variation. A two player facility also helps as it enables good players to alternate turns and compete against one another.

The SPACE INVADER machine captured the hearts and pockets of enthusiasts from five to 95 all over the world. This phenomenon hit Britain in 1980 and incurable addicts evolved everywhere. Its skills and virtues were widely praised. Handicapped children were encouraged to play it in special schools to improve their co-ordination, as well as normal teenagers who were able to speed up their thoughts and reactions as a result of playing. One RAF camp actually used the *space invader* machine on trainee pilots to encourage an orderly mind, logical thinking and quick reactions. The *Space Invader* electronic hand-held game was an enormous success from the first day it was launched. Sales beat all previous toy records and it became a runner-up to *Rubik's Cube* in the coveted 'Toy of the Year' award presented in January, 1981. The *Space Invader* game was the first, and most popular, second generation electronic game produced, and is still as popular today as the original arcade version.

Space Invader was followed by an enormously appealing third generation game, ASTRO WARS. The secret to the success of a game that sold 350 000 pieces on the British market this year was a four-phase changing facility, magnified display, exciting sound effects, a built-in automatic bonus game, five lanes of action, five lives per game, and four levels of play to challenge the most exacting experts. The game culminates with a docking manoeuvre and, if successful, the screen lights up with the acclaim, 'good'. *Astro Wars* won the 'Electronic Toy of the Year' award for sales in 1982, a new category award presented by the toy industry to mark the growing interest and importance of electronic hand-held games.

Now, in 1982, come the most exciting ever fourth generation games and one of the most important is PAC-MAN. *Pac-Man* is a phenomenon in its own right. Not since the original *Space Invader* craze has a game captured the hearts of so many people throughout the world. But with *Pac-Man* an interesting fact has evolved – it has an all-family appeal. Unlike the more aggressive space/shoot-out games that research shows are male-orientated, both boys and girls, men and women, love, and identify with, *Pac-Man.* During 1981, when the arcade game was launched in the USA, Americans spent $8 000 000 per week to play *Pac-Man.* That represents $8 000 000 in quarters (which equals £1 156 000 at today's exchange rate), and means that over a 52 week period more than 832 000 000 people in the USA made conscious decisions to enter the world of a cartoon character. A character that looks like a yellow dot with a mouth, eating his way round a maze, relentlessly pursued by four persistently determined ghosts who have only one thing on their minds – to devour *Pac-Man.*

In 1982, Britain has followed this trend with *Pac-Man* cornering the imagination of people everywhere regardless of age. It is no wonder that a hand-held electronic game was produced and predictable that it would encounter massive public appeal and demand. The *Pac-Man* electronic game has a complete complex maze, escape ports to dodge (if you can), the ghosts, and sound effects to speed up the adrenalin and hook you into a simple in concept, yet surprisingly difficult, game of maze strategy. A special feature of the electronic game is that one player can challenge the computer, or two players can compete in a very unusual way. One player controls the ghosts in pursuit of the other player controlling *Pac-Man.* High scoring is possible in this game for six skill levels are featured and replay indicators light up when you have wiped out every single dot or 'wafer' on the maze board.

So what of the future in electronic games and what will be happening this Christmas? A whole series of fourth generation games will be hitting the British market from now on presenting even more challenges and endless hours to improve on your best score to date. These games are all based on arcade favourites and include DEFENDER, STARGATE, SCRAMBLE, ASTRO BLASTER, CRAZY CLIMBER and TURTLES. Even a game for gothic horror fans has evolved, entitled DRACULA, in which you pit your wits against vampires and the old master of horror himself, Dracula, who rises from a grave when you try to prise hidden treasure from his midst. All of these will be on shop shelves tempting your skills.

Can anyone really manage to save the earth and destroy the attacking humanoids in *Defender*? Well, a thrust and warp speed facility is presented to aid the fastest rocket ship in the universe that can fire in both directions and is equipped with the all-powerful smart bomb. Will you be able to master *Defender* and its ever changing problems? Or blast your way through the *Stargate* before you run out of fuel? Then again, maybe the intricate maze strategy of *Turtles,* where the mission is to avoid angry bugs and save the baby 'turtlettes', or *Crazy Climber,* where climbing to the top of a huge building avoiding a giant condor dropping eggs, flower pots thrown at your head by a giant ape on the top of the building, only to disappear to the next phase or section of the skyscraper when you eventually reach him, is of more appeal.

One thing is certain. Electronic Hand-Held Games are here to stay and with the advent of all the new fourth generation games a very exciting, exasperating, challenging, period lies ahead over the next 12 months . . . *

Two highly popular examples of the electronic hand held game are Arcade Defender (left) and the amazing PacMan 2 – both from Entex Electronics.

AUTUMN ROUND-UP

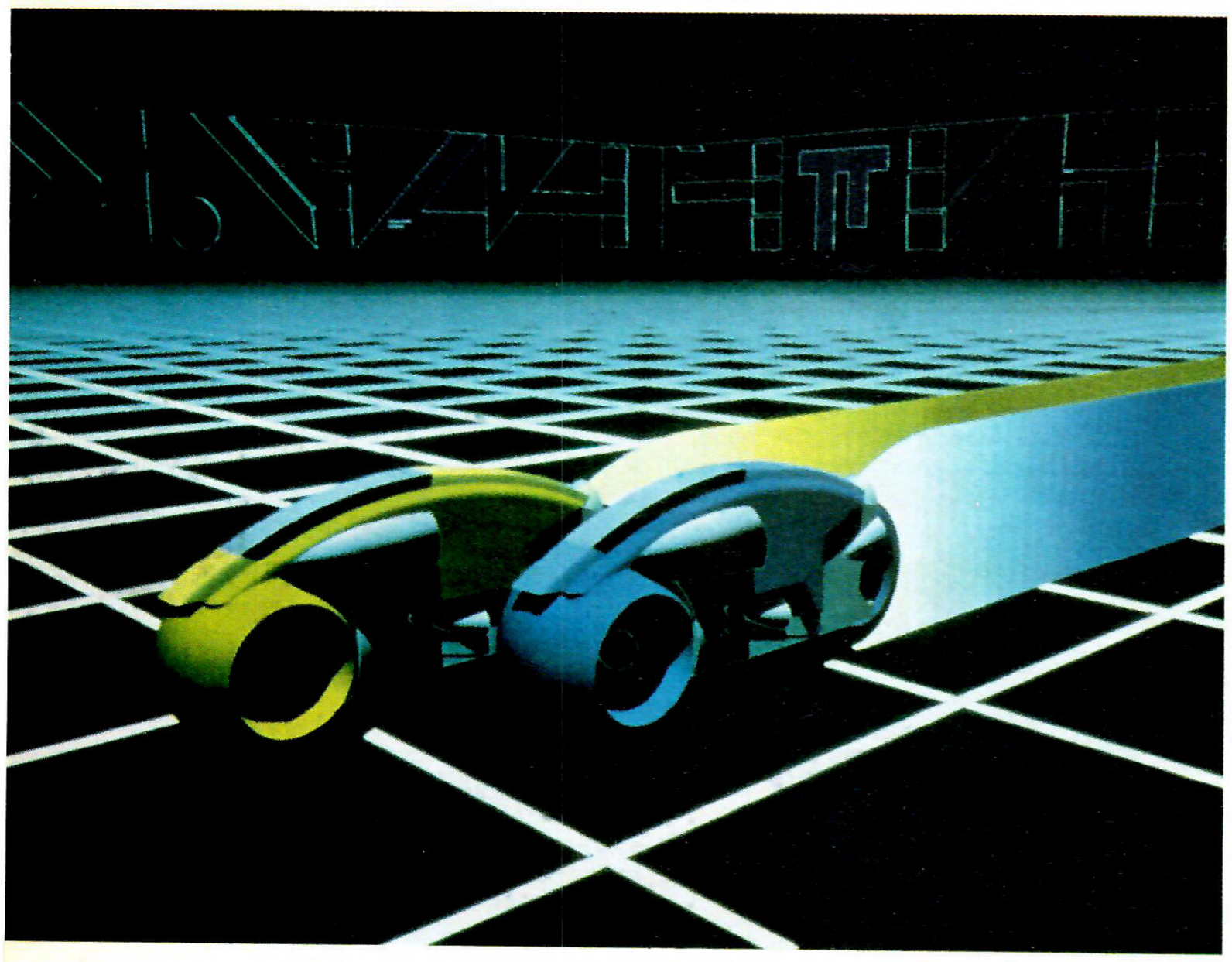
ALAN McKENZIE, EDITOR OF 'STARBURST' MAGAZINE, LOOKS AT SOME CURRENT RELEASES

It's nice to be back! In this column, in case you've forgotten, I usually like to give a round-up of the films in the SF and fantasy vein that you can expect in your local cinema in the months to come and also to cast a critical eye over those films out and about already.

Still around dept.

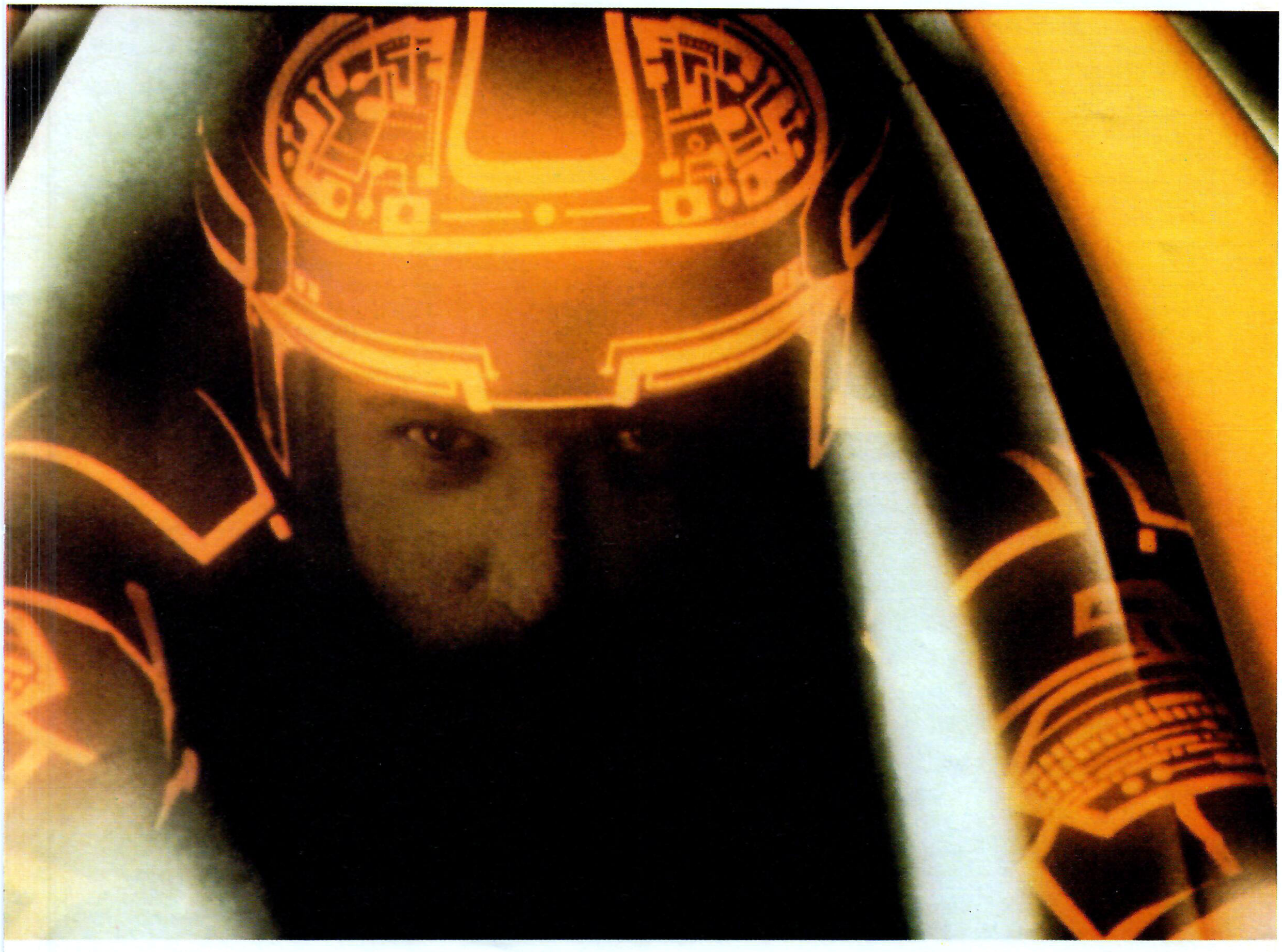
If you hurry you may be able to find a few first class fantasy movies still doing the rounds. Not to be missed is the sequel to *Star Trek – The Motion Picture.* Certainly, *Star Trek II: The Wrath of Khan* is far better than its predecessor. If you were never a fan of the original TV series (anyone here old enough to remember that?) then chances are you are not going to like this movie. But if, like me, you lived *Star Trek* during those first few months of its first airing (or your first viewing, depending on your age!) then you're going to love this. The characters return to form after the aberration of the first movie and spout their personal catch-phrases with delightful regularity. The bond between Kirk, Spock and McCoy is as strong as ever. The *Enterprise* is in danger almost throughout and Scotty is having trouble with the double-talk generators. It's just like the good old days and the film is fully covered elsewhere in this issue.

Another goodie that should be around as you read this is Don Bluth's *The Secret of Nimh*. Based on the famed children's book *Mrs Frisby and the Rats of Nimh,* the film chronicles the adventures of a rat, Mrs Brisby (changed from Frisby, I presume, so she wouldn't sound too much like Frisbee!) as she tries to move



Amongst a crop of SF and fantasy action films released during the latter half of 1982, one of the most spectacular of all is Walt Disney's 'Tron'. The two scenes shown on these pages reveal how live action and computer animated graphics have been successfully combined to dazzling effect. Photos: © 1982 Walt Disney Productions.

Opposite, 'Firefox'. Although the first part of Clint Eastwood's latest film was something of a disappointment the final scenes were spectacular cinema and the 'MiG 31' itself stole the entire picture. Shown here is the full size mock-up – all 66 feet of it – built around a radio station broadcast antenna skeleton with plywood and fibreglass skinning! Photo: © Warner Bros Inc.



before the farmer starts to plough his field. Mrs Brisby's job is complicated by the fact that her youngest son is bed-ridden with a dose of pneumonia and can't be moved. Ultimately, the brave mother seeks the help of the mysterious Rats of Nimh, a group of rodents who escaped from a government research establishment after a series of intelligence-boosting experiments. The Rats have their own electricity supply and other modern conveniences though this part of the story is played down. Despite the obvious opportunities for environmentalist-style preaching, Bluth and his boys wisely stay away from this area. Leave that to Richard Adams, you can almost hear them say. (We'll get to *Plague Dogs,* and its preachy environmentalist story in a later issue). The quality of the animation in *Nimh* is also outstanding. All in all, something of a return to the classic look of the early Disney efforts with the added attraction of a kind of contemporary hard edge to the story. Highly recommended.

Not for the faint-hearted is John Carpenter's *The Thing.* Based on the original short story by Kohn Campbell, 'Who Goes There', rather than the 1951 Howard Hawks masterpiece, Carpenter *(Halloween, Escape from New York)* has created a masterpiece of his own. The idea of the alien as a shape-changer has been retained from Campbell's story and used by the director to maintain suspense at fever pitch. In this respect the movie is something of a whodunnit, as Carpenter repertory player Kurt Russell tries to determine who exactly is the alien. Rob Bottin's special effects are astounding if stomach-churning. Right from the word go, when a husky dog literally turns itself inside out (!) it is apparent that, for the time being at least, Bottin has surpassed his former teacher, Rick *(American Werewolf in London)* Baker.

Only marginally fantasy-oriented is Clint Eastwood's *Firefox,* so I won't dwell on it, other than to say that I thought it so bad as to be almost laughable. A far cry from his two other fantasy outings *Play Misty for Me* and *High Plains Drifter;* in my view *Firefox* marks an all time low in the career of this talented actor/director.

Still to come dept:

John Milius' *Conan* is something of a non-event. Underwritten by the ubiquitous Dino de Laurentiis, who has come to symbolise mediocrity in the fantasy genrè for so many fans, the picture fails to capture the spirit of original author Robert E Howard and instead gives a sword-wielding, muscle-bound oaf rather than the panther-like, cunning survivor of the original stories. That said, those unfamiliar with the Howard tales might find the movie a diverting enough two hours. But I was expecting far more.

Steven Spielberg's *Poltergeist* is little short of a horror masterpiece. Director Tobe (*Texas Chainsaw*) Hooper has made enough personal marks on the film to belie rumours that he was director in name only. Spielberg's skilful script ensures that you really care about the characters before he subjects them to the horrors that lie ahead. Shocking, but always tasteful, *Poltergeist* is a rattling good horror yarn that, for a change, won't have you running for the stomach tablets. But it still packs sufficient punch to scare you witless.

Space is already running short here, so I won't be able to fit in all I have to say about Ridley Scott's science fiction masterpiece, *Blade Runner.* I have covered the story changes in depth elsewhere in this issue, so suffice it to say that I consider *Blade Runner* to be one of the best science fiction films ever made. It is also one of the best films, in any genrè, to come from a British director . . . not an accolade I would use lightly. If you only see one of the films I mention in this column, make sure that it is *Blade Runner.*

Out during October is Disney's computer animated movie *Tron* and yet to come is Spielberg's *ET.* Of the latter, I can say little until nearer the release date in December. The distributors are playing this one close to their chests. But I can tell you that the film is in the enviable position of having taken *$120 000 000* in the North Americas in just over a month. And it looks all set to overtake *Star Wars* (barring accidents, but more on that, and *ET* itself, next issue) before Christmas. *Tron* is a fine little movie which makes interesting use of the fledgling process of computer animation. The only criticism I have is that the live action sequences look remarkably like those dire Disney live-action comedies of the fifties, but this is more than compensated for by the sheer pyrotechnics of the animation footage. David Warner makes an admirable villain and Jeff Bridges is great as renegade programmer Flynn. The film pokes gentle fun at video games and computing in general without ever losing its love for the subject, hardly surprising since director/author Steve Lisberger began his professional life as a computer programmer.

That about brings us up to date on what we can expect before the end of the year. Slated for early next year is the Gary Kurtz/Jim Henson team-up movie *Dark Crystal* and David Cronenberg's *(Scanners) Videodrome.* The third *Star Wars* movie *Revenge (Return?) of the Jedi* is still due for Christmas 1983, though we have heard persistant rumours that it may be earlier – perhaps as early as May.

Meanwhile the third chapter in the *Superman* saga has gone into production at Pinewood studios. Needless to say, Christopher Reeve returns as the dual personality superhero along with regulars Margot Kidder, Jackie Cooper and Marc McClure. Guest stars include Annie Ross, Pamela Stephenson, American comedian Richard Pryor (as a baddie) and Annette O'Toole as Lana Lang, a regular character from the comic books. A late addition to the cast is Robert Vaughn. The film is to be directed by *Superman II* helmer Richard Lester and is masquerading under the title of *Superman III* for the time being. I can only hope they'll change the title before the picture is released. I, for one, am getting a little tired of the dearth of imagination displayed by Hollywood when it comes time to christening their latest projects!

Next issue I will be reporting on the new season of *Doctor Who* and all the news that's fit to print from the world of SF and fantasy cinema. *Be* here! *

The muscular Arnold Schwarzenegger plays the title role of 'Conan – The Barbarian' from Twentieth Century Fox. Photo: © 1981 Dino De Laurentiis Corporation.

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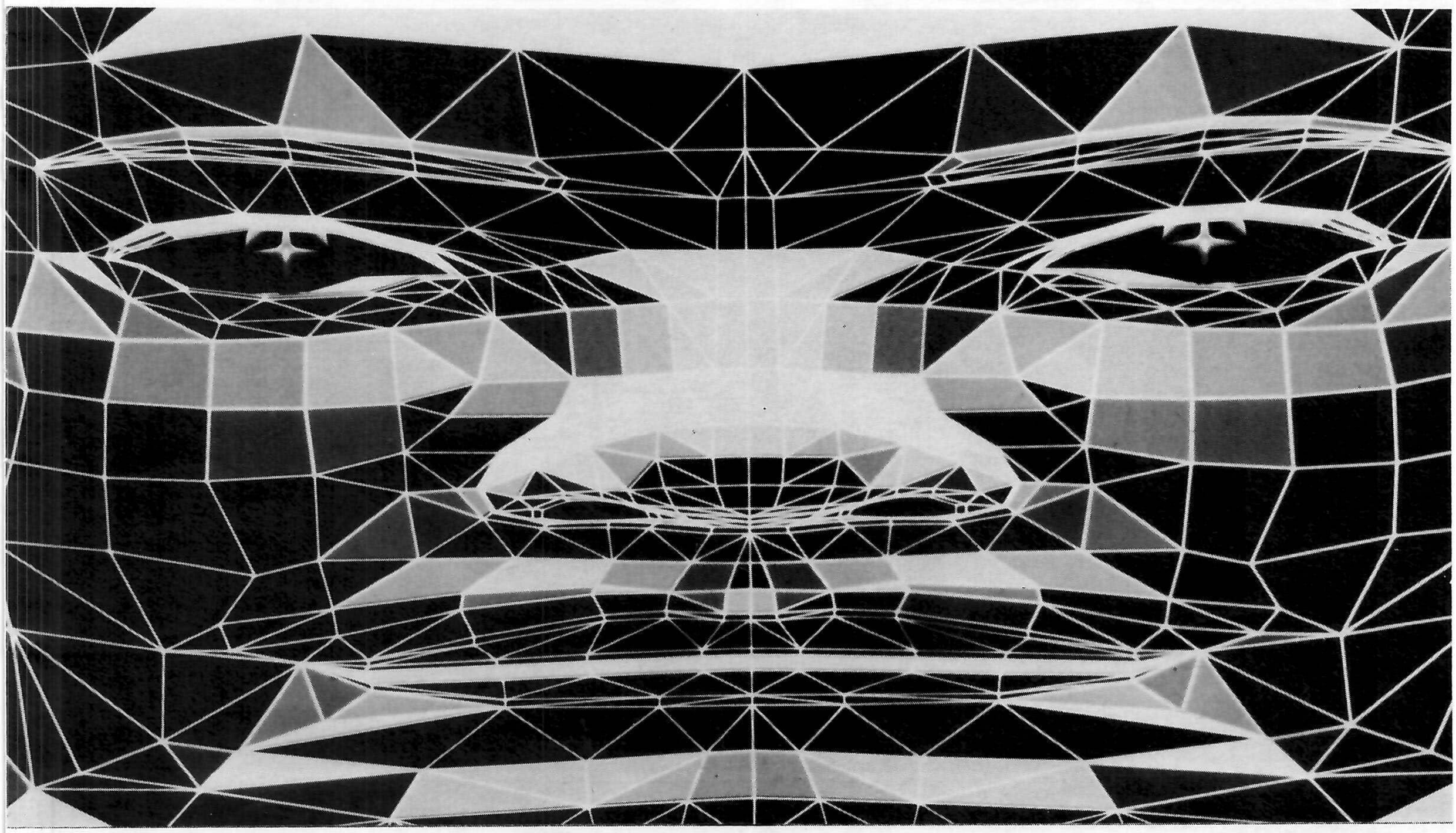

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RESTAURANT
HARDY

UFOs — A VOYAGE TO THE STARS OR FANTASY?

BY PETER WARRINGTON

A number of people who have examined the subject of UFOs have concluded that the only reason the mystery has not yet been solved is that people generally do not *want* to solve it. Whilst I cannot say that I agree entirely, I'm bound to say that they do have a point.

The most widely-held opinion is that the world is subject to scrutiny by an alien intelligence; that the aliens visit the earth in spaceships. Regrettably this opinion is also held by quite a number of respected workers within the UFO field whose scenarios do tend to differ, sometimes considerably. One suggestion is that the intelligence need not actually travel to Earth, their scrutiny being far more subtle. In essence all these ideas boil down to the same thing, little men (apparently not green ones!) and flying saucers influencing the way of the world. I submit that there is *not a single scrap* of real *evidence* to support the idea that the earth is being visited by aliens.

I have been actively involved investigating UFO reports, researching aspects of the subject and allied topics since 1967. With that amount of experience some might wonder how I can say there is no evidence for the world being visited by aliens, or ask why am I still interested if that is the case. The basis for the first question, I think, is obvious, the second, however, is explained by the fact that since many people disbelieve in alien visitations the whole concept of UFOs is utter nonsense.

So why *am* I still interested and very much involved in the subject? I have no wish to get bogged down in a discussion of whether UFOs exist, or not, based on the premise that something *eg,* an aircraft, is a UFO until it is recognised as an aircraft; therefore UFOs exist. Suffice to say that, in my opinion, the vast majority of people who have accepted the enigma have done so without questioning the subject closely enough, and those who have rejected it out of hand have done so in exactly the same way. UFOs are not spaceships, nor are they all utter rubbish either. Between these two extremes lays an area ripe for study and one which shows definite signs of yielding significant consequences for at least two or three branches of science.

Why should it be that a great many cases of strange experiences and observations which get reported as UFOs, and subsequently identified as aircraft, satellites or other quite rational explanations, have been interpreted by the witness as sightings of flying saucers or spaceships? Answer that and many other unanswered questions about the subject will be answered too.

Closer Encounters?

For many decades science fiction has concentrated on the possible existence of life elsewhere in the universe, almost to the point where it should, perhaps, be called 'space fiction'. Without a doubt the notion of life beyond the Earth has been around for a far longer period, than many might realise. Although it is popularly thought that the 'dawn of the UFO era' came in 1947 with the Kenneth Arnold case, unusual things have been seen in the sky during almost every period of recorded history. UFOs are not a new phenomenon. Many of the early events were interpreted as of supernatural origin, a fact which is hardly surprising. Such events have to be seen in terms which are at the fringe of contemporary understanding. The same could be said to be true today except for one major factor, we are now far more able to establish an explanation for the greater majority – in excess of 90% – of these events. Of course it is one thing to forward a tenable explanation, and quite another to get the witness to accept it.

Once an explanation for an event has been found, it is frequently impossible to convince the witness that they have misinterpreted something usually quite commonplace. Any comments about the witness's fallibility are met with considerable opposition, and comments challenging the witness's recollection, or testimony, are seen as attacks on their integrity and met with an aggressive response.

The classic UFO; a 'nuts and bolts' interplanetary craft, painted by David A Hardy. A traditional hypothesis not shared by our author who presents an intriguing alternative.

This attitude by many observers is, to say the least, unfortunate and denies researchers the opportunity to explore the factors relating to the witness's interpretation of the original event. We must have the freedom to probe this aspect of the reports; investigation into this area could be extremely useful to our understanding of the phenomenon.

A whole host of problems arises whenever UFOs are discussed, the principal one is that the mystery is continually perpetuated. This regeneration is the result of three factors. Firstly, an almost constant flow of raw reports from the witnesses. Secondly, by the typical media presentation of the subject, and thirdly, the sad fact that some of the blame can be fairly laid at the feet of 'ufologists'.

I very much doubt if much can be done to stem the flow of raw reports from the populace, or even if that is desirable. The public at large, and many 'expert witnesses' are remarkably poor observers. The well known example of a car crash with several eyewitnesses, each with a different account, need not be enlarged here to demonstrate the point. What is more, the general lack of knowledge of even the most basic details of astronomy or meteorology is a continual source of misconceptions.

The most active area of this perpetuation, in my view, is that of the mass media for their presentation of UFOs, with very few exceptions, has been one of reinforcing the popular belief that UFO equals spaceship. This is done by sensationalising eyewitness stories with virtually no regard for an explanation no matter how obvious or accessible. Time and time again one has to correct massive misconceptions introduced by the poor quality coverage given the subject by the media. I recently had the opportunity to see the library file on 'flying saucers' held by a major British newspaper, I expected a not too well informed dossier; what I found bore close resemblence to a child's partially completed scrapbook.

It is not only the witnesses who see the mystery as an emotive subject, several investigators have lacked objectivity, although in recent years some advances have been made which reduce this factor. The British UFO Research Association recently introduced a scheme whereby their investigators are accredited for a limited period then, subject to the standard of their work, accredited for a further period. Another important improvement is an idea of mine that has been taken up by many investigation groups and introduced as the Investigators' Code of Practice. The code is receiving widespread acceptance, is intended to make the investigators more aware of their responsibilities to witnesses, and others in the subject, and to act in the best interests of all concerned. As a result the quality of investigations ought to be more strictly controlled and the value of the reports improved.

An endeavour to rationalise

When a study of most subjects is commenced, boundaries are drawn so all concerned know how far from central points to explore. This approach is not practical when considering UFOs; of course boundaries could be drawn at extremes, though they would serve little purpose. It is left to individuals to determine their own limits. Some might reject instances when a witness reports having seen a single light in the sky at night, A fairly reasonable attitude, after all very little data is obtained from this type of report and they are received in large quantity. There is a high probability that the light is all which could be seen of something quite normal, such as an aircraft. Clearly we ought to monitor these reports even if we do nothing more than record their basic details.

But what of the cases towards the fringe of our subject? Events where the witness claims to have seen a 'flying saucer' and humanoid entities alongside it apparently picking samples of flora? These must form an important part of our study. Should we, however, expend our energy on reported sightings of isolated humanoid entities, such as the wave of incidents that swept the area of North Wales and adjacent English counties a few years ago? Or the event which occurred in Rossendale when two youths say they saw a circle of pulsating red lights beneath the surface of a reservoir in which they were fishing? The case of a woman who dreamed she had seen a UFO whilst driving home with her fiancé, but now she is quite unable to decide if it was a dream or not; it all seems too vivid, too 'real'. Speaking personally, all these cases should fall within our boundaries, plus a few more besides. The simple fact is that at present we don't know enough about the subject to draw the line and say, *'this* is the UFO enigma-*that* isn't'.

One thing we do know, however, is that virtually every witness is convinced that they have seen *something* unusual. Some of the witnesses display almost fanatical determination, that not only have they been unable to

identify what they saw, but that others will never identify it. They use such phrases as, 'it was out of this world' and, 'beyond our comprehension'. Other witnesses show that quiet confidence which we all have from time to time when we know we're right and everyone else is wrong. Whilst investigating a report a few years ago I sat with the witness in his lounge. When I asked him where he had seen the object, he gestured over his shoulder towards the french windows, and said quite simply, 'there, between the apple tree and the garage'. In another case that has impressed me since I heard of it, a man was driving across the Pennines on a road through dense mist and he was confronted with an object he was quite unable to identify. It was the size of a double-decker bus and it passed within 20 feet of his stationary car. He said that if, at its closest approach, it had turned about its centre it would have hit the car. He had been able to see the object clearly, as if through a tunnel in the mist, and although in close proximity was quite unable to identify it. As he described the event to a colleague and I, his sincerity was unmistakable.

Many people who have rejected the existence of anything enigmatic about the subject have done so without regard for this aspect of the evidence. This is not to contradict my earlier comments about witness fallibility, I refer here to the witnesses in the small number of events which are yet to be explained by tenable solutions.

When UFO events, which remain unidentified, are collated it is clear that they fall into two groups – observations and experiences. The observations are described in objective terms, and the experiences tend to be put forward as a subjective event.

This distinction is most important, it implies two regions of the enigma and also something about them. The observations are a fairly passive event for the witness and this permits them, to a degree, to quantify details of the event and assess it in an objective manner. However, the experiences tend towards involving the witness, sometimes by actual interaction with the witness, or else by their proximity to the event. In this latter category, witnesses more frequently describe details in subjective terms or, at least, are less certain about quantifiable detail. It is also into this group that all the 'exotic' events fall. The implication of these two groups is that we ought to be seeking a *separate* explanation for each type of event. I do not exclude the possibility here of there being some degree of overlap, or that only two solutions are necessary. In fact it appears that three or four explanations might eventually be attributed to the cause of the mystery.

At least some of the cases we have, involve a mixture of the two categories of events, yet I do not see this as a flaw in the argument. In many of these cases it is reasonable to suggest that whatever the stimulus is for the objective events, under some circumstances it may account for experience-type events also. I would qualify 'some circumstances' as being a mixture of witness characteristics and the particular situation.

In the past, science generally has chosen to distance itself from the subject, believing it to be the realm of the 'nutcases' and unscientific enthusiasts, and of no value to their ordered establishment. In many ways their attitude is understandable, however when expressed both sides have lost advantages. Contained within the reports, which remain unidentified after investigation, are a considerable number of events that I believe represent an, as yet, unrecognised type of atmospheric phenomenon. It may also be that this store of data contains evidence which would expand our current understanding of phenomena which are only accepted by the scientific community, *eg,* ball lightning.

From time to time researchers of the subject have approached individuals, or specific departments, of the scientific community and interest and cooperation have been forthcoming. I have been surprised on several occasions by the interest shown by such individuals and organisations, and the amount of time, effort and, by inference, money, which they have been willing to spend on providing information or assisting with a specific problem.

Although of poor quality this enlargement from a frame of Peter Day's intriguing 8mm cinè sequence is typical of the object's appearance, an object which, to date, has not yet been identified. Photo: Peter Day.

A UFO on film

One of the cases that I believe *could* represent a new phenomenon is an event which took place in the English countryside on a January morning in 1973. It was witnessed by several adults and about 50 schoolchildren, the witnesses were spaced over a radius of a few miles, and the observation of one witness is supported by a snatch of cinè film. The cameraman and principal witness is Peter Day; the details he relates are typical of other eye witnesses. Mr. Day was driving to a business appointment through the countryside between Thame and Aylesbury at about 9am on January 11, 1973. He saw a round, orange object apparently travelling at a constant speed horizontal to the horizon, emitting light and flickering a little. From the object's apparent size, angular speed, and elevation, he gained the impression that it was about three quarters of a mile away, perhaps a little more. The object passed behind trees and other objects as he was driving along looking for somewhere to stop and use the cine camera which he had with him. When he was able to find a safe place to park, which afforded a reasonable view from which to film, he was only able to secure less than 30 seconds of the reel.

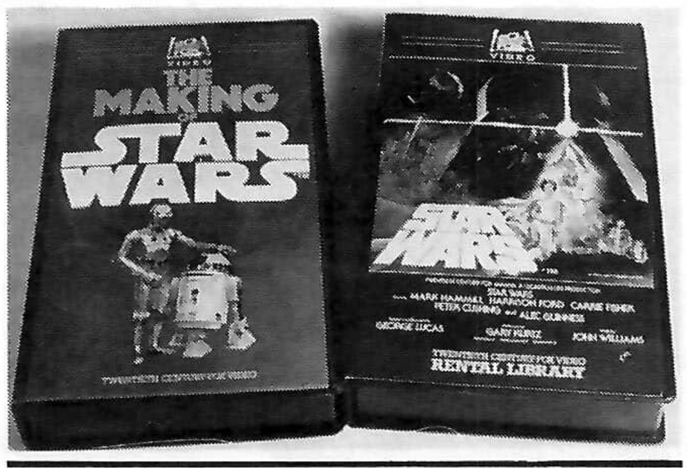
In my opinion Mr. Day's few feet of film is probably the best piece of evidence available to us. The object's disappearance was sudden; 'it was simply there, then it wasn't'. The other adults who saw the object during the brief couple of minutes it was observed were apparently closer, at least their testimony of the size of the object implies that they were, they describe it as, 'half a ball, the top rounded and the bottom flat'. They also say it gave the impression of spinning, some report that the object was stationary for a short time. Several children say the light from it illuminated the vicinity; I consider this doubtful, although other aspects of their testimony seem accurate. Estimates suggest that some of the people were within a few hundred yards, yet were unable to identify the object. None of the witnesses report anything which directly indicates an aircraft or helicopter being the root cause of the incident. To date the case has not been explained; a number of people have said that in the absence of detail to clarify the point, an aircraft or helicopter must have been responsible. I cannot accept this explanation on the basis of the evidence we have available. The report is typical of a large number of cases involving red or orange objects which display characteristics outside those normally regarded, or accepted, for the phenomen known as ball lightning.

An alternative theory

Recent developments in the study of 'experience-type' events are bound to stir up controversy. Dr. Alvin Lawson and a colleague, Dr. William McCall, have recently presented findings of a study of abduction by aliens; the results are as original as they are interesting. Dr. Lawson is well known for his work in regressing people with little knowledge of the UFO mystery to imaginary experiences involving close encounters. His results from that study were to the effect that close encounters, whether 'real' or imagined, are very similar in detail. This conclusion was totally rejected, or widely accepted, depending on the individual's point of view. Now, after much criticism of the earlier work, Dr. Lawson and Dr. McCall have undertaken a study of those who claim to have experienced an abduction by aliens. This study, using about 60 witnesses, was intended to bring forward data about this particular type of experience with a view to clarify the many similarities of these cases, despite their world-

continued on page 73

SOUND & VISION



VIDEOS

Star Wars *(CBS Fox Video)*
Released in VHS, Beta and Video 2000 formats. 116 minutes. Colour.

Star Wars is not so much a film as a phenomenon; an industry in its own right and a box-office smash that has, so far anyway, managed to remain the biggest money maker of all time. But now its dominance is challenged by Steven Spielberg's breathtaking *ET* which will be heavily featured in the next issue of *New VOYAGER.* Whatever the outcome of the battle, *Star Wars* is set to become a top seller all over again with the recent release of the video version.

We last saw the film in 1978 and now, five years later, were surprised that it hadn't really dated although the main characters seemed even more youthful than we remembered them. The video's quality, both visually and soundwise, is excellent; of a very high order indeed. Small screen notwithstanding, the effects come over well enough but cannot, in all honesty, compare with the big screen, Dolby stereo-enhanced original. It is this factor that may well disappoint a new audience but for true fans there will be few grumbles.

There seems little point in recapping the *Star Wars* story since most readers will be totally familiar with every minute of it. It's all super entertainment and, of course, the loveable robots, R2D2 and C3PO, completely steal the picture. The supporting cast, Mark Hamill, Harrison Ford, Carrie Fisher, Sir Alec Guinness and Peter Cushing turn in good performances and the film unfolds at a cracking pace. *Star Wars* fans will be buying up copies of the new video by the thousand and, despite an unavoidable lack of impact in some of the film's final battles due to the aforementioned transition to small screen format, we would have no hesitation in recommending it to video owners. Just the thing to prevent family boredom on a wet weekend afternoon and *New VOYAGER* readers can take advantage of a special offer – see page 14 for details.

RLR/SA

The Making of Star Wars *(CBS Fox Video)*
Released in VHS, Beta and Video 2000 formats. 47 minutes. Colour

If you've enjoyed *Star Wars* itself, this video 'short' of behind-the-scenes activities and interviews with George Lucas, Gary Kurtz, and most of the cast, will be a desirable addition to the video library. Like the above tape, quality is superb and it is also recorded on Dolby stereo.

Narrated by William Conrad, many of the film's secrets are revealed to provide some indication of the high technology – not to mention the finance involved – in bringing this super space-opera to fruition. Ideal companion to the *Star Wars* video, but we suggest you watch it *after* the film otherwise your enjoyment might well be dulled with a pre-knowledge of effects techniques.

High points include the interviews with George Lucas himself who seems painfully modest and retiring, perhaps at the time not fully aware of the incredible success his brainchild had become. Now Lucas is the hottest property in Hollywood and, post-*Star Wars,* has enhanced his reputation even further with films like *The Empire Strikes Back* and *Raiders of the Lost Ark.* We now await to be enthralled even further when 'Episode Six' of the 'Whills Journal' appears. **RLR/SA**

The Day the Earth Stood Still *(CBS Fox Video).*
Released in VHS, Beta and Video 2000 formats. 88 minutes. B/W

Thankfully, the video cassette market is not concentrating only on the latest blockbusters from Lucas and Spielberg. These days you can get virtually any film you like, going right back to the very beginnings of cinema. Many classic SF films were made in the early years; *Metropolis, Things to Come,* and, coming into the 1950s, *Forbidden Planet* and *The Day the Earth Stood Still.* The latter is included in the CBS Fox Video range and although it still makes a fairly regular appearance on television,is well worth adding to your collection of SF landmarks. It stars the late Michael Rennie in one of his most memorable roles as Klaatu, the visitor who lands in America's capital with the warning that war must cease, or Earth will face the consequences.

The film was made in 1951 in black and white, although no less noteworthy for that. Its director was Robert Wise, who helmed the first *Star Trek* film; we thought he handled TDTESS better! Of those readers who have seen *Tron,* who noticed, pinned up in Bruce Boxleitner's work area, the famous phrase from the film, 'Klaatu Barada Nikto'? A neat compliment . . . **MI**

Alien *(CBS Fox Video).*
Released in VHS, Beta and Video 2000 formats. 116 minutes. Colour.

More up to date is the most successful SF/Horror film for years, Ridley Scott's *Alien.* Also recently seen on TV, but if you relish hiding behind the settee while the crew of the *Nostromo* get ripped apart for the beastie's lunch, this one's for you. Frankly, the video-disc version (on Phillips Laservision) is of better quality, as it's up to transmission standard, but for most people the video cassettes seem more convenient, and the quality difference is acceptable. **MI**

DISCS

Tron *CBS Records and Tapes*

Tron the Soundtrack combines the synthesiser player originally known for her interpretations of Bach into the field of movie soundtracks. Wendy (nee' Walter), Carlos has done soundtracks before, notably for Stanley Kubrick's *A Clockwork Orange* and *The Shining*. On those recordings her compositions were mixed with other recordings, or with established works. For *Tron* she has, for the most part, written the entire score, apart from the two by 'Journey'. For the first time also, I believe, Carlos has written for the orchestra as well as the synthesiser, and is joined on many of the tracks by the London Philharmonic. The credits to the film also included the Los Angeles Philharmonic, but they are absent from this album. The choice of label is fairly obvious as both Carlos and the group 'Journey' normally record under the banner. If you like the Carlos style, and her own compositions, you'll like this record; the mixing with the orchestra is particularly effective. **MI**

SCIENCE FICTION BOA

Until a relatively short time ago, board gaming in this country was dominated by the **Waddington**-type games, *Cluedo, Buccaneer,* etc., essentially directed at the younger generation with just a few others, such as *Risk* and *Monopoly,* recognised as semi-adult games. In America, however, the board game developed rapidly, particularly after World War II, in a variety of directions, aimed very much at the adult market. A large proportion of these, at first, were historical board wargames based on battles and campaigns, while others related to games and sports. Gradually, spearheaded by such companies as **Avalon Hill** and **Simulations Publications,** these games began to appear on the English market and, although board gaming is still by no means as big in this country as it is in the States, it has become a recognised pastime.

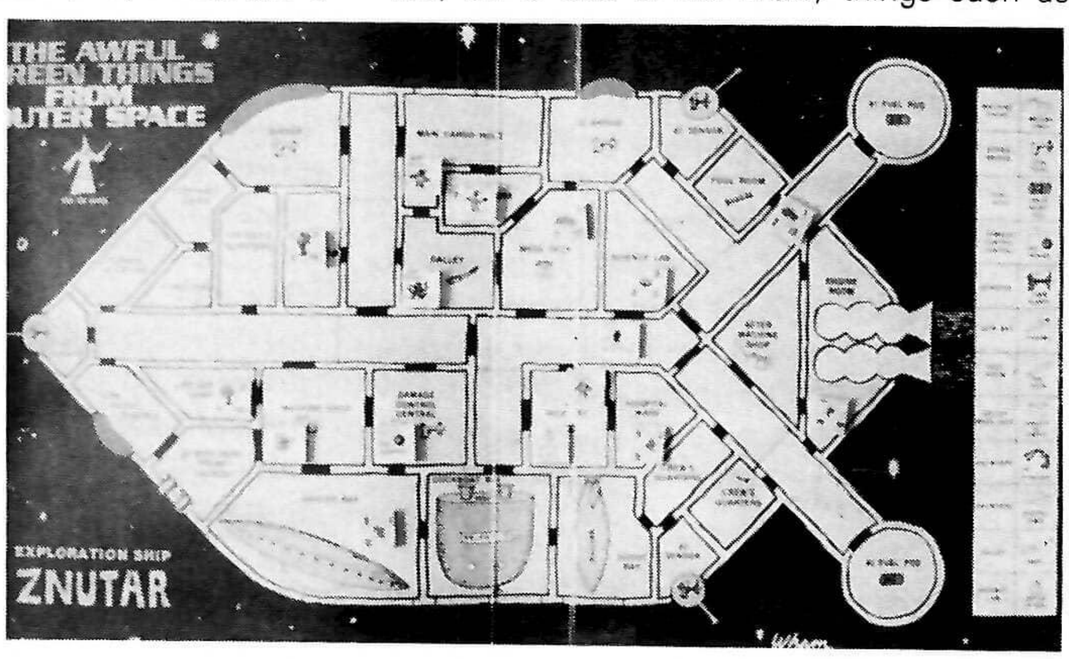
Science Fiction was a fairly late subject to arouse the board game designers, but with the widespread interest occasioned by films such as *Star Wars,* and TV programmes like *Star Trek* and *Blake's 7,* it was not long before a whole series of suitable board games began hitting the market. Broadly speaking, SF games can be divided into two main groups – those set on actual planets, often based on a well known book, or series of books, and those which concentrate on space travel and battles in space. Of the two, the former group would appear to have been the most successful, partly because the association with an existing theme gives an initial impetus to sales, and partly because the pure space travel/battle games have tended to be either too complicated or too simple. Ideally, of course, a game *should* have relatively simple rules which are easy to follow, but be capable of needing complicated tactics to win; this sounds easy but is difficult to achieve in an area as technical as space travel.

Today, the newcomer to Science Fiction board gaming is faced by a fairly wide selection of games; which one does he choose to start with? The price of board games, at present, does not encourage random purchase of something which may not turn out to your liking, and it is often difficult to tell from a quick glance at the box and the rules just how the game will turn out. For the newcomer, therefore, I will try to give a cross-section of games which I have played myself and which, hopefully, will cover most tastes.

Let us start with the type of game which does not rely exclusively on space travel but which sets up a situation on a particular planet. One of the best of these, in my estimation, is DUNE, an **Avalon Hill** game, based on the best-selling story by Frank Herbert. This is a multi-player game, with a maximum of six, which lasts an average of two to three hours; it can be played with as few as four but the more players, the better the game. A knowledge of the book is a slight advantage, but by no means essential. The six players represent different factions which are trying to control the planet, and each has its advantages and disadvantages. There are the Fremen, who are the natives and live on the planet's surface, which is about their only advantage – all the other players have to bring their forces down to the planet from space – the Empire, which has a financial advantage; the Guild, which controls the shipment of troops from space; the Beni Geserit, a strange religious order of women who can see into the future; the Atreides who have psychic powers, and the Harkonnen who are experts in treachery. The game revolves around obtaining spice, which appears in different parts of the planet with each move, and controlling certain fortresses; inter-player reaction goes on the whole time as each player attempts to reach the spice before his neighbour. Players whose forces end the move in the same area must fight each other using a simple, but very tricky, combat system in which a combination of troop counters, leader value, special weapons and treachery all have to be taken into account.

The basic rules are very simple, and can be mastered by one reading; the game itself is fun to play and calls for a certain amount of skill and tactical ability. At certain stages of the game it is permissible to form alliances between players, and this can, in fact, be vital; unfortunately, however, if a pair of players declare an alliance this usually forces other players to make similar arrangements in sheer self-protection! DUNE is a game to be played fairly lightheartedly; it forms an excellent introduction to Science Fiction board gaming but may not be to the liking of those who want a serious game of space warefare.

Another game which falls within this general genrè is AWFUL GREEN THINGS, a **TSR** product. This features a spaceship in flight which suddenly finds itself invaded by 'Awful Green Things' whose sole object in life seems to be to eat the crew and reproduce themselves – shades of *Alien*! The board, in this case, represents a plan of the spaceship, divided up into its various compartments and areas, and counters represent the individual members of the crew and the four types of 'Green Things'. Initially, the crew members are distributed around the ship, and the first wave of 'Green Things' are placed in certain areas. This is a two player game, one representing the crew, who must try to get rid of the invaders, and the other the 'Green Things' whose object is to wipe out the crew and thus take over the vessel. In various compartments of the ship there are a variety of objects which may, or may not, be of use to the crew; things such as



Above, 'Dune' by Avalon Hill and right, 'The Awful Green Things from Outer Space'. Opposite page sees 'Apocalypse' and 'Stargate' – all highly popular board games described in these pages by our author.

RD GAMING

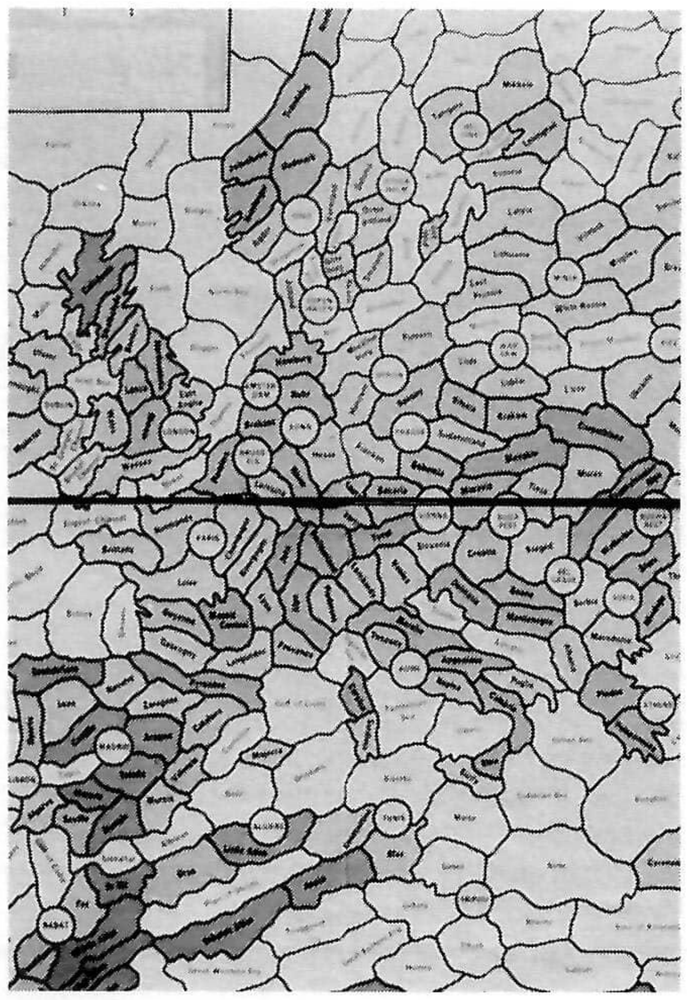
TONY BATH OFFERS A GUIDE TO SOME POPULAR TITLES

baseball bats, ray guns, hypodermic syringes, cans of gunk, etc. Unfortunately, the crew do not know initially just which of these things will be of any use; they pick them up and try to use them, and at that stage draw a counter from a pile. These counters give the effect of that particular object, which can range from extremely destructive to positively beneficial to the recipient. In each move, the surviving 'Green Things' produce more of their kind or move from one stage to another, each, of course, more powerful. The crew have the slight advantage that many of their weapons can be used from a distance, whereas the 'Green Things' have to resort to hand to hand combat; once in personal contact, however, the 'Green Things' will usually be victorious, so that crew strategy must consist of hit and run while they find out just which of their various weapons are most effective against the enemy.

AWFUL GREEN THINGS is essentially a fun game which is not meant to be taken seriously, but it does call for skill and tactics besides a good deal of luck. In all the games I have watched, or participated in, the 'Green Things' have been the winners, though on occasion the crew player has achieved a partial success by getting some of his crew members to safety in the lifeboat; I think the game is tilted a little in favour of the 'Green Things', but in theory, at least, it should be possible for the crew to get the better of them. Playing time is usually about an hour. Again, not really a game for the serious-minded player, but very enjoyable in a lighthearted way.

A **Games Workshop** product which hit the market last Christmas, and sold very well, was *Dr. Who.* Based, of course, on the long-running BBC TV serial, I would tend to classify this item as bordering on the juvenile rather than the adult, but the serial itself has such a wide-spanning audience that it is difficult to be didactic. The game is very well designed, produced on a multi-player basis, and the rules well laid out and easy to follow. Game length varies quite considerably, but averages two or three hours. Despite its somewhat juvenile slant, this is a game to be taken rather more seriously as well as enjoyed. Knowledge of the serial is a definite advantage.

Another offering from Games Workshop is APOCALYPSE, which, in a way, is an updating of one of the first board wargames, RISK. The board consists of a map of the world divided into large numbers of small areas, and the object of the game is to gain control of the world. It is a multi-player game, of course, and the more players the more interesting the game. In the initial stages the play consists of gaining additions to the areas you begin with: much of these are empty and can be occupied without running foul of the other players. The areas, however, vary in value according to their colours, and groups of areas are more valuable than single entities. The areas you control decide what extra troops you receive each move. Sooner or later, of course, you have to begin fighting the other players in order to expand your territory, and this is where the main difference from RISK arises, since when you win battles you receive, in addition to extra territory, one stage of a nuclear rocket. You can assemble this rocket in a number of stages, the



amount of which determines the range it can fly; it will not only devastate the area it lands in, but also affect adjoining territories as well.

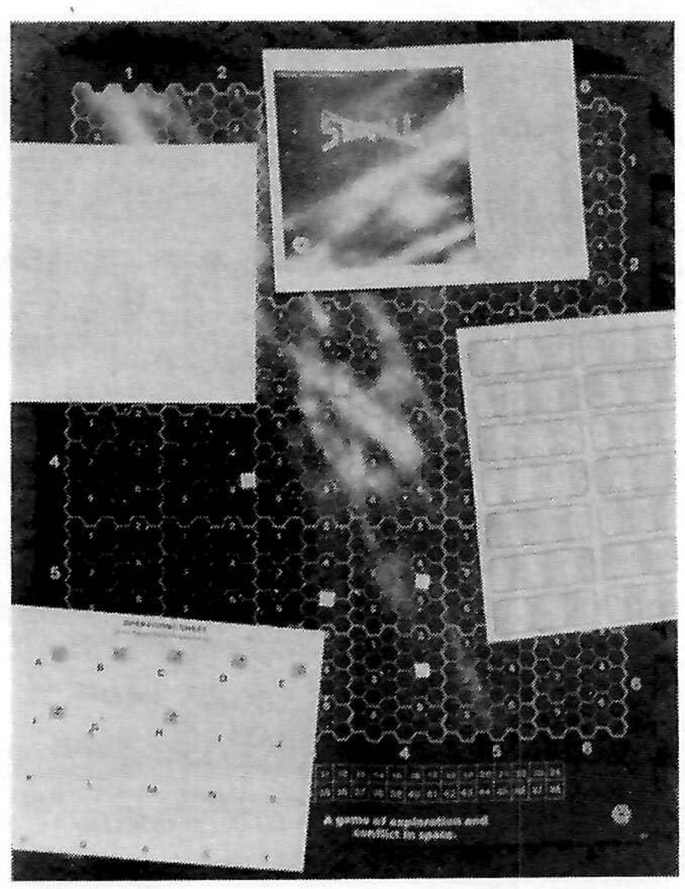
APOCALYPSE is a serious adult game which requires considerable skill to play, although I must admit to a certain dissatisfaction with its combat system. Game length depends largely on how things go, but will usually be around three hours. Suitable for the more serious player but still a very enjoyable game.

From **Simulations Publications** comes TIME TRIPPER, which is really more of a role playing game. It can be played solo as well as with two, or more, which can be an advantage. Basically, you select equipment from what is available and then find yourself dumped in some section of time, which may be either forward or backward. Whatever section it is, you will undoubtedly find yourself facing some sort of tricky situation from which you must extricate yourself before jumping to some other time sector. The rules are well devised and simple to follow, and it is a game requiring a good deal of thought and expertise. You can get killed *very* easily!

Turning now to the section of games dealing essentially with space travel and warfare, one of the earliest on the market was **Waddington**'s 4000AD. This suffers somewhat from the difficulties inherent in a space game which tries to be at all realistic, in that it is extremely difficult to control your movements and arrive where you want to go at the right time. This can be frustrating in a game devoted to establishing and protecting colonies and makes the game difficult to win. A game can drag on without a lot actually happening, and it is not one I would advise as an introduction to this type of game.

A much better bet for the newcomer is an offering from a newish British company, **Standard Games and Publications, Ltd.,** fast making a name for themselves as producers of well-designed and lavishly-colourful games. The particular one is called STARSHIP CAPTAIN and is, purely and simply, a game of space warfare. The mapsheets represent deep space, with a few stars scattered about for show, and on these you manoeuvre fighters, destroyers, cruisers and freighters as you strive for supremacy in a series of well-designed scenarios, or others which you think up yourself. The ships, with the exception of the fighters, are quite large, and so designed that they fit exactly into a combination of hexes. This, at once, makes it easier to move them since you can see exactly what space they occupy, and more difficult tactically because you can only pivot in certain directions. The ship counters are designed graphically in several colours and look so much better than the usual single hex counter.

The rules, as usual with this company, are extremely simple and easy to understand; the actual play is a lot more tricky. Be advised, and start off with the simple scenario rather than jumping in on the more complicated ones; you will find it quite difficult enough to successfully manoeuvre the relatively small number of ships you are concerned with, and this will give you a much better chance of success when you try to handle larger numbers in the later scenarios. The combat rules have some nice innovations; for instance, the smaller fighters can fire their guns every move, whereas the larger destroyers and cruisers are limited to certain times. This is very important tactically, since a fighter has to get into almost point-blank range to hurt a cruiser, and must, therefore, be manoeuvred carefully so that it can avoid the cruiser's fire until it can deliver its

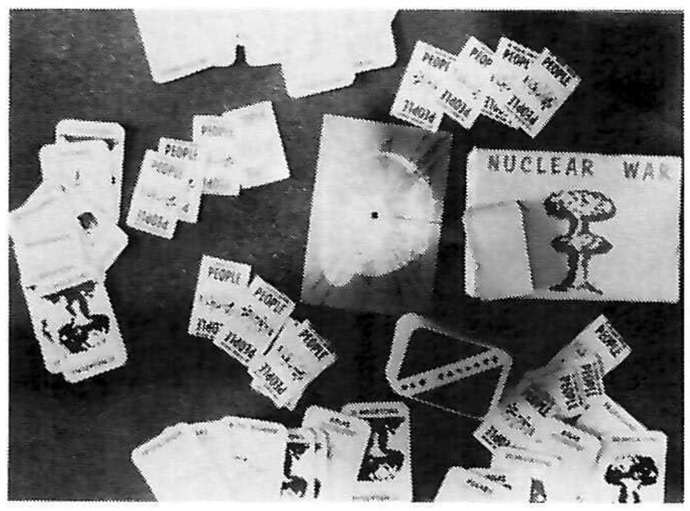


own missiles. This calls for a good deal of tactical skill; obviously the more games you play the better you should become.

STARSHIP CAPTAIN, though it looks on the surface a simple game, is far more complex than it appears yet, at the same time, puts the emphasis on the player's skill at handling his ships rather than knowledge of complicated rules. I would go so far as to say that, in my opinion, it represents a breakthrough in this type of game.

For those who require a really complicated space game then I can certainly recommend **Yaquinto**'s STARFALL. Not exactly the sort of game you can sit down to play in a couple of hours, this calls for a lot of patience since it takes about half an hour to work out each move you make. It's not that the rules are hard to follow, just that you have to go through so many processes each time. Basically, this is a game of colonising the stars. You start off with ships from your home galaxy and send them off on missions into the unknown. By a process of dice throws you determine which galaxy you land up in, and this gives you a starfall point which you can use in going to and from that galaxy in future; but every time you go to a fresh galaxy you do so on a chance throw till your starfall point is established. Once having reached a galaxy, you have to establish a lot of other points, such as its level of civilisation, etc. In addition to the players – it's a multi-player game – you can also have hostile fleets erupting out of nowhere to plague you. As a campaign game spread over a long period it is probably one of the best, and most logical, games around; very well designed and produced, but, in my opinion, too much for an evening's play.

I cannot complete this selection of Science Fiction games without mentioning a great favourite of mine – **Flying Buffalo**'s NUCLEAR WAR. Strictly speaking it does not qualify here because it is a card, rather than a board, game but it *is* a Science Fiction game and is great fun. Compared with the big board games it is very cheap, since all it comprises is two packs of cards, a very short set of rules, and a spinner mounted on a card. The packs of cards consist of a pack of population cards, ranging from one to 25 million; and a second pack which



contains propaganda cards and nuclear weapons. Six or seven players are ideal for a fast, furious, game in which you try to outwit everyone else. The idea is to reduce everyone else's population to zero while retaining some of your own; this is done by two methods, propaganda or outright war. Each move you play one card from your hand and replace it from the deck; the propaganda cards enable you to remove large stacks of population from one of the other players and add them to your own. You have to be very careful just whom you annoy in this way and try to avoid too many players picking on you! In addition there are a number of wild cards which have special effects, such as one which says, 'Two million of your highly moral old ladies have just emigrated to a rival power because of your nuclear policy' or the dreaded SuperGerm which wipes out 25 million people. When you run out of propaganda cards you start dropping nuclear bombs, using the spinner to calculate results; but this can be self-destructive too, since if you wipe out a player he has the right of retaliation, dropping all his remaining bombs on you before he retires from the game.

The game sounds as if it would be in particularly bad taste, but in fact it is an immensely amusing and irritating game in which *anything* can happen. You can start off with an awful hand and end up winning because everyone else is busy destroying each other, or lose with a good hand – I recently had the annoying experience of being dealt a fabulous population hand of over 100 million (the average is about 30 million) and losing 70 million of it before I played a card. A game normally lasts about half an hour and my friends and I reckon it's the best value for money on the market.

The games I have mentioned are only a few of those currently available, with more being produced all the time. I hope, however, that they have shown that there is something for most people in Science Fiction board games and will encourage more board gamers to try this fascinating section of the hobby. *

5.....4.....3.....2.....1.....

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RED STAR IN ORBIT

FROM 'VOSTOK' TO 'PROGRESS'. BY MAT IRVINE

How much of the so-called 'space race' between the United States and the Soviet Union was based on fact, and how much invented by the media, is open to debate. It would be naive to suggest that there was no rivalry, but examination of the manned space efforts of both nations indicates that, for the most part, interests were in radically different directions.

It could be said that America made a mistake going to the Moon at the time it did. The bulk of NASA's concentration was to this goal for over a decade. As an ideal it cannot be faulted, and no-one can take away the fact that Neil Armstrong was the first man to walk on the Moon. Yet the 'nitty-gritty' of the day-to-day man in space starts in Earth orbit, and this is where the Russians headed. They knew the Americans would be ahead, technically, as far as the lunar landing was concerned so why waste the effort?

Let's look at the craft the USSR was building, and by then they were into the *Soyuz*-phase. The craft wasn't designed for travel to the Moon; it's an Earth-orbit craft only. Possibly the circum-lunar *Zonds* were *Soyuz*'s without the Orbital Module, as they carried biological specimens which were returned to Earth. Boosted by the larger D-Type (*Proton*) launcher, the *Soyuz* could quite easily be put into a trans-lunar injection trajectory. Rumours even hinted that the first flight could have been manned, but telemetry details (which are extremely difficult to hide) indicate otherwise. So the Russians went for the most logical step in space exploration, the establishing of a permanent space station in orbit around Earth.

One thing that both American and Soviet future flights would have in common was the perfection of rendezvous techniques. Both *Vostok* and Gemini flights practised soft rendezvous, actual manoeuvring of craft into similar orbits, and Gemini flights, in particular, spent a great deal of energy on rendezvous techniques with Agena and ATDA target vehicles.

Both nations suffered tragedies which led to set-backs. The States lost the Apollo 1 crew, Grissom, White and Chaffee, in the Command Module fire and the Soviet Union lost Komarov during the recovery of the first *Soyuz* flight. Both nations were put back about two years as a result. By the time matters were perfected, the missions of the two countries had really diverged.

After two test flights of the re-designed *Soyuz, Soyuz* 4 and 5 were launched and docked together at the beginning of 1969. For the first time a crewman left his original capsule, space-walked to the other, and eventually returned in a different spacecraft. Next, the flights became even more ambitious. This time, three *Soyuz* craft were launched, 6, 7 and 8, and although they did not all hard dock together, it was the first time three spacecraft had been in the same orbit. This led a build-up to the launch of the Soviet Union's first space station – *Salyut* 1. Launched by the D-Type rocket, it was placed in orbit on April 19, 1971.

As usual with Soviet spacecraft missions, initial details were hazy, but it soon became apparent that the basic structure consisted of three cylinders of varying diameters, a docking port for *Soyuz* at one end, a rocket motor at the other and two sets of solar panels. The interior appeared to be split into the airlock, a control section, and the workshop itself; the latter, the widest of the diameters. Quoted dimensions indicated it was very similar to the Manned Orbiting Laboratory that the USAF was planning in the 1960s, but which had been abandoned by 1969.

A haven in orbit

The first cosmonauts to visit the new station were launched on April 23, aboard *Soyuz* 10. Although they docked with *Salyut* 1, no transfer inside apparently took place and they returned only two days after the launch. Whatever had been the problem, had been presumably corrected for the *Soyuz* 11 mission launched on June 6, and the crew did transfer to the space station. The types of experiments, which would later be continued on a regular basis in later craft, had their beginning here and all seemed to proceed perfectly. But disaster struck the Soviets again when the cosmonauts returned. The *Soyuz* Descent Module landed as planned, but when the recovery crew went to release the cosmonauts they found they were dead – killed when the air of the cabin leaked out due to a fault in the sealing between the two manned modules of the *Soyuz* craft.

Salyut 1 was not visited again and destined to re-enter Earth's atmosphere only five months after it was launched.

Salyut 2 lasted for an even shorter time. Launched on April 3, 1973, it broke up a mere 22 days later.

What was presumably *Salyut* 3 fared even worse. Launched on May 11, 1973, it was in space for only 11 days before re-entering and doomed to be hidden under the blanket name of *Cosmas* 557.

The Soviet Union had problems, therefore, not only with the *Soyuz* craft, but with the *Salyut* design. It was over a year before the actual *Salyut* 3 was launched, on June 25, 1974, and meanwhile the modified *Soyuz* had been tested with *Soyuz* 12 and 13 flights. Now the craft carried only a two-man crew, they wore spacesuits during launch and recovery (which they didn't before) and the third crewman's position was taken up with additional life-support equipment. The *Soyuz* also had its solar panels removed, relying on battery power for the short ferry flight to the *Salyut*. *Soyuz* 14 became the first craft to dock with the new space station on July 3, 1974.

It soon became apparent that the *Salyut* design had been modified; externally, the most visible feature was the change in the solar panels. Gone were the two pairs, to be replaced with three grouped centrally, and at right-angles to each other. The interior had also undergone modifications and improvements with more emphasis placed on the cosmonauts' exercise and leisure time. There were also Earth resources-type cameras on board and *Salyut* 3 performed a Landsat-type service during the period it was unoccupied.

Salyut 3 lasted until January, 1975, with no other crews visiting since *Soyuz* 15 failed to dock. Before *Salyut* 3 re-entered and burnt up, *Salyut* 4 had already been launched during the previous month. The first crew were aboard *Soyuz* 17 and spent nearly a month in the new space station.

Soyuz 18 visited *Salyut* 4 in May for a mission lasting 63 days, the longest Soviet flights to date. This also indicated that for flights of this length (and presumably longer) the Soviets would have to develop cargo flights. The first in this category was the next *Soyuz* mission – *Soyuz* 20 (*Soyuz* 19 was the Apollo/*Soyuz* Test Project craft) which was odd in that it was unmanned, but still classed as a *Soyuz,* not a *Cosmos.* It really could be more correctly called the first of the new type of supply ship, now called *Progress.*

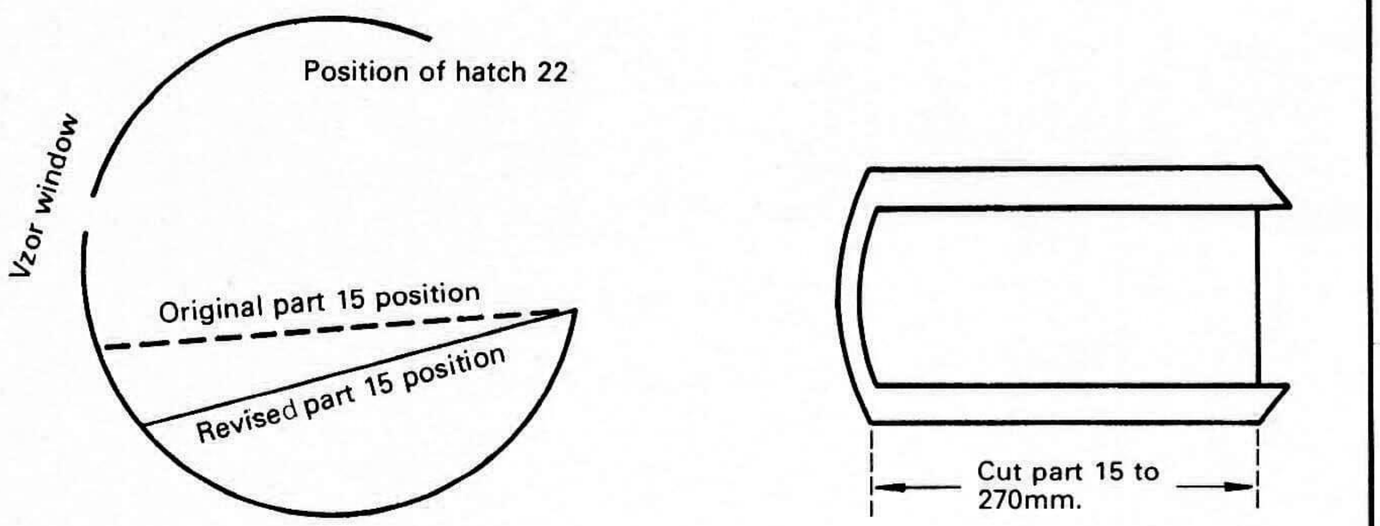
Salyut 4 was replaced with *Salyut* 5 in June, 1976, and soon visited by *Soyuz* 21 and, in turn, *Soyuz* 23 and 24. (22, although launched, was not intended to dock with *Salyut.*) This latter *Salyut,* although of similar type to the earlier 3 and 4, appears to be the first of the next generation. The interior was equipped with more experiments and instruments and, what would become more apparent with *Salyut* 5, seems to have been fitted with an aft docking port allowing a completely redesigned engine, for it has to fit around the docking ports itself.

Success

All these flights were a build-up to the Soviet's most successful space station to date, *Salyut* 6, which made its debut on September 28, 1977. First planned vist was by *Soyuz* 25, but this failed and the crew returned without docking.

Soyuz 26 (December 11, 1977) *did* dock and this confirmed the fact that these new *Salyuts* had two docking ports, for *Soyuz* 26

FIGURE 1



used the aft station. One of the first priorities was to check the original docking port which, having been given clearance, meant that *Soyuz* 27 could join them. The craft docked on January 27, 1978, and made up the first three-component spacecraft in orbit. The *Soyuz* 27 crew also made the record books for when they returned to Earth they used the *Soyuz* 26 craft, leaving the one they arrived in still attached to *Salyut.* Later that month, *Salyut* 6 took part in yet another first when the first 'proper' *Progress* supply craft docked on the 22nd. For the first time supplies of fuel, air, water, food and scientific equipment were transferred from the unmanned craft to the space station.

Details of *Progress* were initially confusing, although it soon became apparent that it was no more than a modified *Soyuz.* Instead of manned Orbital and Descent Modules, this space station was packed with cargo. The Orbital Module looked almost like the *Soyuz* version and the Descent Module, as it wouldn't have to return, did not need items such as a heat-shield.

Progress could also perform other functions. It could act as a tug, and propel *Salyut* into a higher orbit (although the space station does have its own engine) and also act as a 'dustcart', taking away waste material which would be burnt up when *Progress* re-entered.

The Soviet Union had now a space station that worked, albeit on a small scale, provided a workspace for the cosmonauts and could be re-supplied whenever necessary.

VEB Vostok

The world's first man into space was Yuri Gagarin, launched by the Soviet Union on April 12, 1961. The Soviets named his spacecraft *Vostok,* which translates as 'east' into English, and for many years it was shrouded in mystery. Few pictures were released, and those that were seemed to be designed to mislead, rather than inform. Then, all of a sudden, a full-size replica was shown at the 1975 Paris Air Show and went on display at the Moscow Exhibition of Economic Achievement, where in fact it can still be seen. It immediately dispelled all the rumours that had gone before and revealed the *Vostok* craft in its full glory. That is assuming the replica is genuine, but after all these years I think we can safely say it is!

The *Vostok,* as normally depicted, consists of the spherical capsule containing the cosmonaut, the double-coned instrument module and retro-rocket, the latter hidden by the last stage of the launch rocket which is how the 1/25th scale *Vostok* is modelled in the **VEB** kit.

The VEB model has been around for many years and hails from East Germany although its availability has been patchy to say the least. It was available in 1977 and to celebrate the fact I produced an article in the *December* issue of *SCALE MODELS.* After this the model disappeared again and made the kit a rapid addition to the collectors' 'wants' lists.

Recently, **Scale Model Distributions** have taken over the import of VEB and it seems that the kit should be around for a while yet.

Construction

The kit itself still comes packed in a sturdy box, and the parts are moulded in silver and white. It's a shiny, brittle sort of polystyrene and care has to be exercised when removing some of the parts from the sprues as some of the joints are rather heavily moulded. The plans have changed from the original kit and you now enjoy almost western-style assembly instructions using numbers and symbols. There is also an English description sheet, with a breakdown of the various parts, and a brief history of the six flights.

Construction is relatively straightforward and many of the pieces have their identification number stamped on them. The final rocket stage, *parts 1-4,* and the equipment module, *7* and *8,* go together easily, and can be held with elastic bands whilst they dry. The capsule, though, needs rather more attention and one of the faults with the kit (that of the angle of the cosmonaut's seat) shows up at this stage. If it's installed as per instructions, the base of the ejector set hides the *Vzor* optical device window. (This is used by the cosmonaut to line up the capsule with the horizon and it isn't much good hidden behind a few inches of steel!) To correct this the whole seat assembly needs tilting to a greater angle. By cutting the seat base, *part 15,* as shown in **Fig 1,** and gluing it at the greater angle indicated, you will at least allow the cosmonaut to steer his capsule.

The four capsule parts are numbered, well three of them are, so the fourth can be worked out by elimination! They also have corresponding numbers one each edge, so the lining up of these sides shouldn't be a problem. However the inserts that fit into three of the sides with hatches could be, as they are not numbered. (Which is odd as I'm sure they were on the first kit I built in 1977.) *'Side' 9* has the entry hatch fitted, which can be left loose. The hatch number is *22,* which can only really be identified from the instruction sheet with the parts laid out. However if they've fallen off the sprue, which the review sample had, here's how to identify them. *Part 22* has an offset window, near the edge. *Side 10* has hatch *23* (without windows) fitted outside and the flat plate *24* inside. In all cases the "o" markings are designed to line up. *Side 11* has the remaining hatch with the (nearly) central window, *part 25,* and the smaller flat plate with a hole *part 26* fitted inside. The windows of which there are three in total have a piece of thin acetate to fill them, but this hardly does the refractory glass of the original justice. Lacking suitable alternatives, it's probably better to leave them out!

The interior of *Vostok* is fairly spartan when compared with, say, Apollo or even *Vostok's* contemporary, Mercury, with the majority of the flight instruments included in the kit. Painting is best done at this stage and the capsule can either be assembled complete with just the entry hatch *part 22* left loose, or alternatively one side (*12* is best) made removable.

Turning attention to the instrument module, or service module borrowing Apollo terminology, the 13 air bottles, which come in 26 halves, are attached to the upper indentations. The four electrical harnesses, *parts 47-50,* need to be carefully removed as they are somewhat fragile, then carefully shaped to conform to the curve of the module. These are positioned between the location holes for *part 46,* below the air bottles. Even the new instructions are not exactly clear as to which harness goes where so if the module is held with the four-hole notch (for the antennae) at the 12 o'clock position and viewed from the capsule end *part 47* is at the top, *part 48* is at the bottom, *part 49* on the right and *50* on the left. The thin 'wires' from each of these parts stretch upwards to the raised ring just below the air bottles themselves. The longest antennae, *part 41,* fit into this notch, while the other set of four, *part 45,* fit around the retro-rocket cone.

Considering the usual difficulty in moulding antennae, VEB haven't done too bad a job. They do not appear to be too far off scale thickness, although there is the possibility that these, too, are over-size for strength.

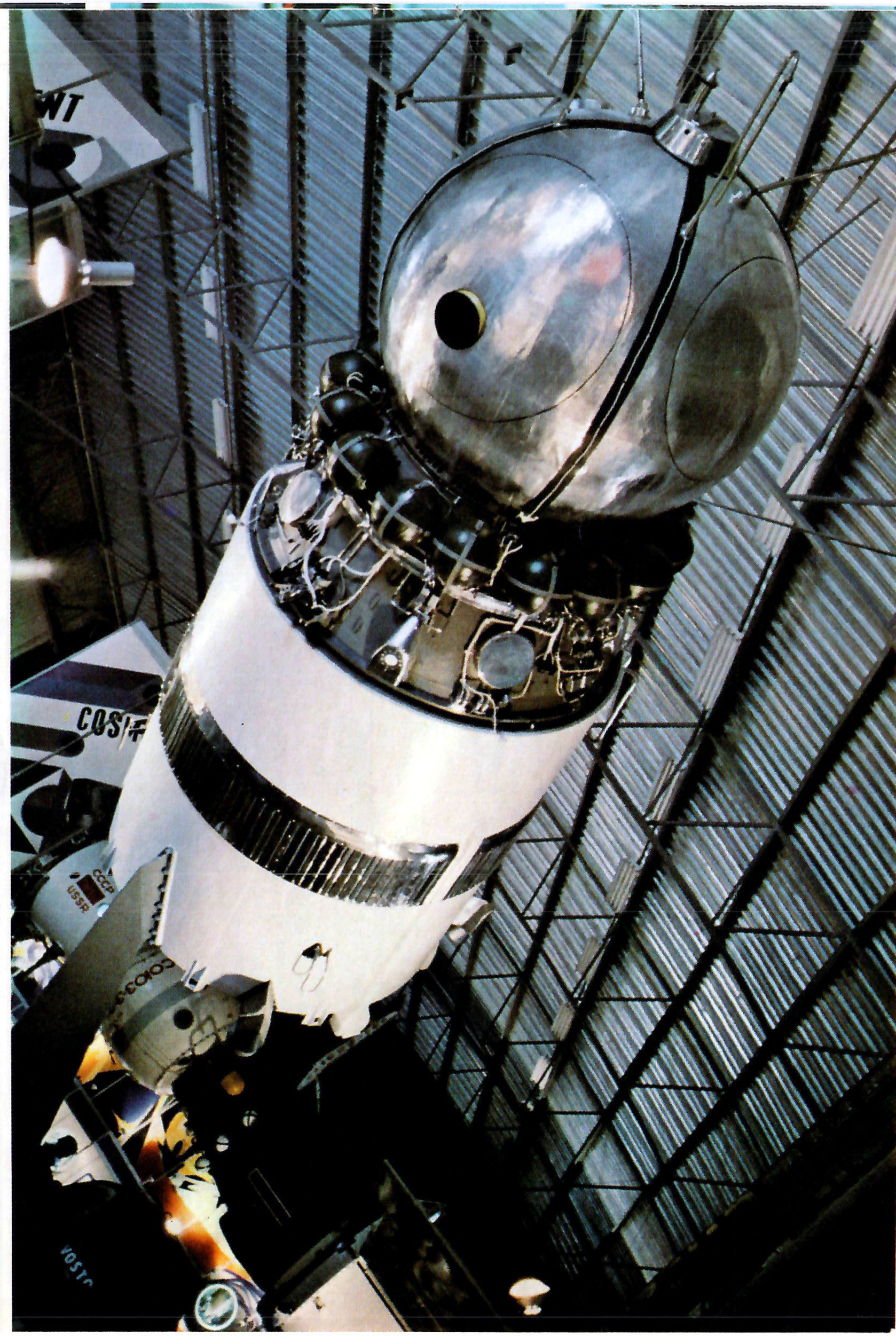
The final stage of assembly is fairly clear from the instructions, although I still reckon that the vernier rockets are slightly too large when compared to the full-size version.

Colours

The capsule itself should be painted **Humbrol** *11 Silver,* and the equipment module in dark green. The display *Vostok* is in a rather bright dark green similar to Humbrol *80 Grass Green.* This is also the colour of the four tensioning bands that hold the capsule to the equipment module. The retro-rocket part of the structure, the part hidden by the final stage, is probably metallic grey, say, *53 Gunmetal.* The air bottles

Colour pictures. Top, the 'Vostok' spacecraft in all her glory offers vital reference for VEB kit modellers. Below, the 'Progress' part of the 'Soyuz/Salyut' photographed at the Paris Air Show. Photos: Mat Irvine

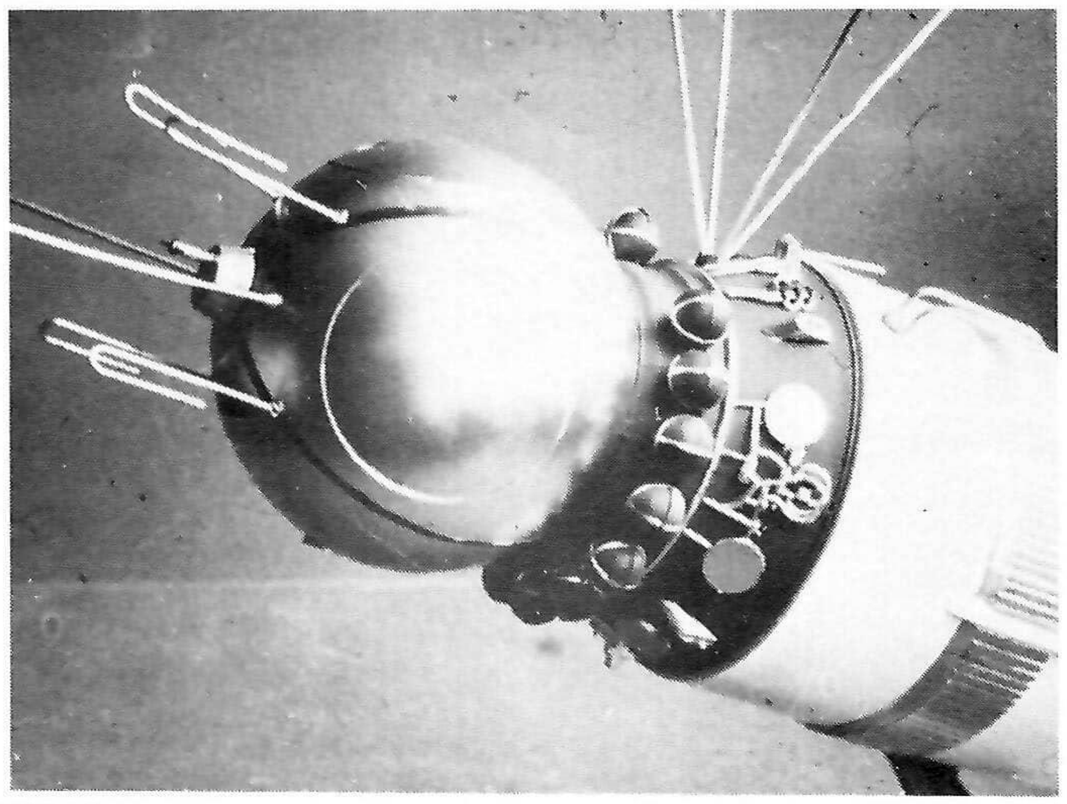
ПРОГРЕСС


CCCP
USSR

are also green, with silver straps; these are easier to paint while still attached to the sprue. The band on the equipment module, below the air bottles, is silver as are the shroud attachment points, *part 46.* The harnesses are silver with black details. The final rocket stage on the exhibition mock-up is white and if you intend to build the model to match this, white is the correct colour with a silver centre band and vernier rockets. However, I think it is safe to assume that the real *Vostok*s were dark green in colour. The few, rather poor, pictures of the first flights seem to indicate this. The engine plate is *53 Gunmetal,* and the engine bell *77 Navy Blue.*

The interior of the *Vostok* capsule is covered with a light buff material, Humbrol *Light Stone 121.* The seat frame is silver, and the seat itself, in metallic blue. The hollow for the cosmonaut is white, including the headrest. The end panel of the seat, where the parachute is stored, is silver with a dark green parachute and pale buff webbing. The main instrument panel, *part 28,* is a greenish-grey, with black gauges and a blue globe. The switch panel, *part 27,* is black with grey switches, and the TV camera, *part 29,* is white. The other panel, *part 30,* houses the radio and manual control and is light tan with black details.

The cosmonauts wore a loose fitting overall over their spacesuits which was coloured bright orange – *82 Orange Lining.* The moulding on the figure does, in fact, include spacesuit details, which is really incorrect, but inside the capsule this really doesn't notice. The boots are black and the helmet white. One of the tiny 'CCCP' transfers supplied with the kit can be applied to the front of the helmet.



Mat Irvine's completed VEB model 'Vostok' certainly looks the part as modified in accordance with his suggestions for improvements. Photo: Mat Irvine

Final Assembly

The instructions state that the three assemblies can either be glued together, or left loose. Obviously, for examination, the latter is more desirable, though the units do have a tendency to fall out of each other. The new instructions have come up with an ingenious method of joining the sections together, with the provided elastic band, but I reckon **Blu Tack** works just as well! One useful tip the instructions do come up with is to fill the base of the stand with plaster in order to make it more stable.

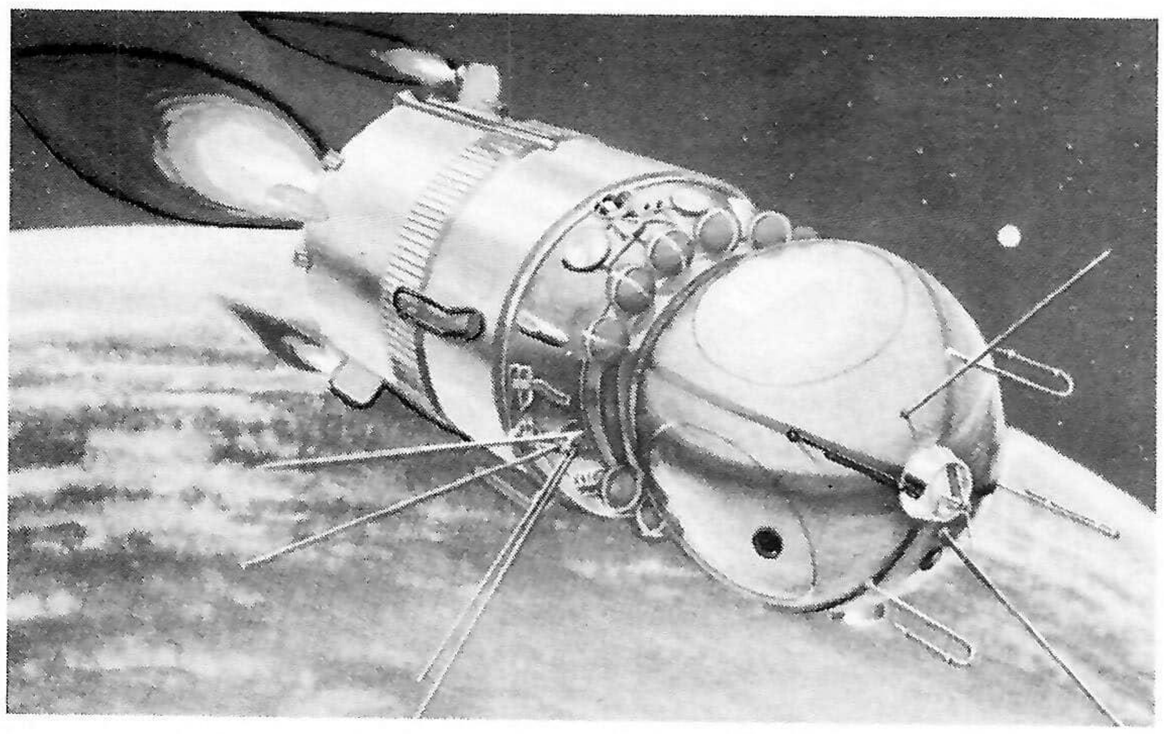
The remainder of the transfers are superfluous as *Vostok* probably carried no external markings. They are also printed in the German version of the word – *Wostok.* Should you require a name for the base, **Letraset** will produce either the English/Latin *Vostok* or the Russian/Cyrillic *Boktok.* (Luckily, although in Russian, all the letters are still Latin in this particular word, so ordinary Letraset can be used for either, although they do produce special Cyrillic versions.)

Epilogue

The VEB *Vostok* has its faults and in many ways does not come up to the standards of western and Japanese kits, but it's a nice kit to work with and makes up into a pleasing and sturdy model. It also has that very big plus that it's virtually the *only* Soviet spacecraft kit widely available at the moment. RRP in the UK is £4.10. *

Model construction-kit Vostok 1

VEB PLASTICART



The model is an extremely good copy of the first space ship which was launched on the 12th of April, 1961, by the USSR. You find the cosmonaut in the interior of the model on a catapult seat. On the walls the instruments can be seen. The light hatches are glassed. The exit hatch and the parachute hatch covers can be disengaged so that opening is possible.
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Individual parts 108

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—DEATH OF A THOUSAND CUTS

'STARBURST'S ALAN McKENZIE RELATES THE INSIDE STORY

The first time I saw Ridley Scott's magnificent science fiction film *Blade Runner* was in March. It was a merchandising screening and, as with most merchandising screenings, the cinema was virtually empty. The picture had not been before the British board of film censors at that time and the version of the film we saw was almost exactly the version that Scott had delivered to the **Ladd Company.** The movie was absolutely stunning, from the innovative opening graphics to the final shot of a lift door slamming shut. I remember thinking at the end of *Star Trek – The Motion Picture* that effects technician Doug Trumbull would have to pour it on to outdo himself with his next film. With *Blade Runner* he has achieved precisely that. The visions of future Los Angles that reach the screen in Scott's new movie are pure 'state of the art', thanks to Doug Trumbull and his unique 65mm motion control effects unit. The story of *Blade Runner* details the adventures of Rick Deckard, an ex-Blade Runner, or replicant hunter, attached to the Los Angles Police Department. When five Nexus 6 replicants, superior synthetic human duplicates, return to earth from off-world Deckard is drafted in, reluctantly, to track them down and 'retire' them. Deckard's job is further complicated when he falls in love with an even more superior female replicant, Rachel (Sean Young). More than that I won't say for fear of spoiling the film for *New VOYAGER* readers.

Three versions

Imagine my horror when, three months later, I attended another preview of *Blade Runner.* I could hardly believe my eyes. Was this the same film I had seen a mere 90 days before? Instead of Ridley Scott's stately build-up to a fugue of terror and violence I was watching something that rattled along with all the grace and artistry of a runaway locomotive. The portions of the film which Scott had set aside for mood and character development had been overlaid with a sub-Raymond Chandler voice-over narrated by Harrison Ford. (For those readers unfamiliar with the works of Chandler, it is generally recognised that, while he worked within the format of the low-brow detective thriller, his material always rose above the style by virtue of its sheer artistry.) This narration was full of non-sequiturs and just plain bad writing. More than that, the action sequences had been recut, tightening them up and removing some of the more suspenseful suggestions of violence. Character development scenes and plot exposition had been heavy-handedly underlined with excessive use of that same voice-over. All in all

HARRISON FORD AS RICK DECKARD. ALL PHOTOS © 1982 LADD COMPANY

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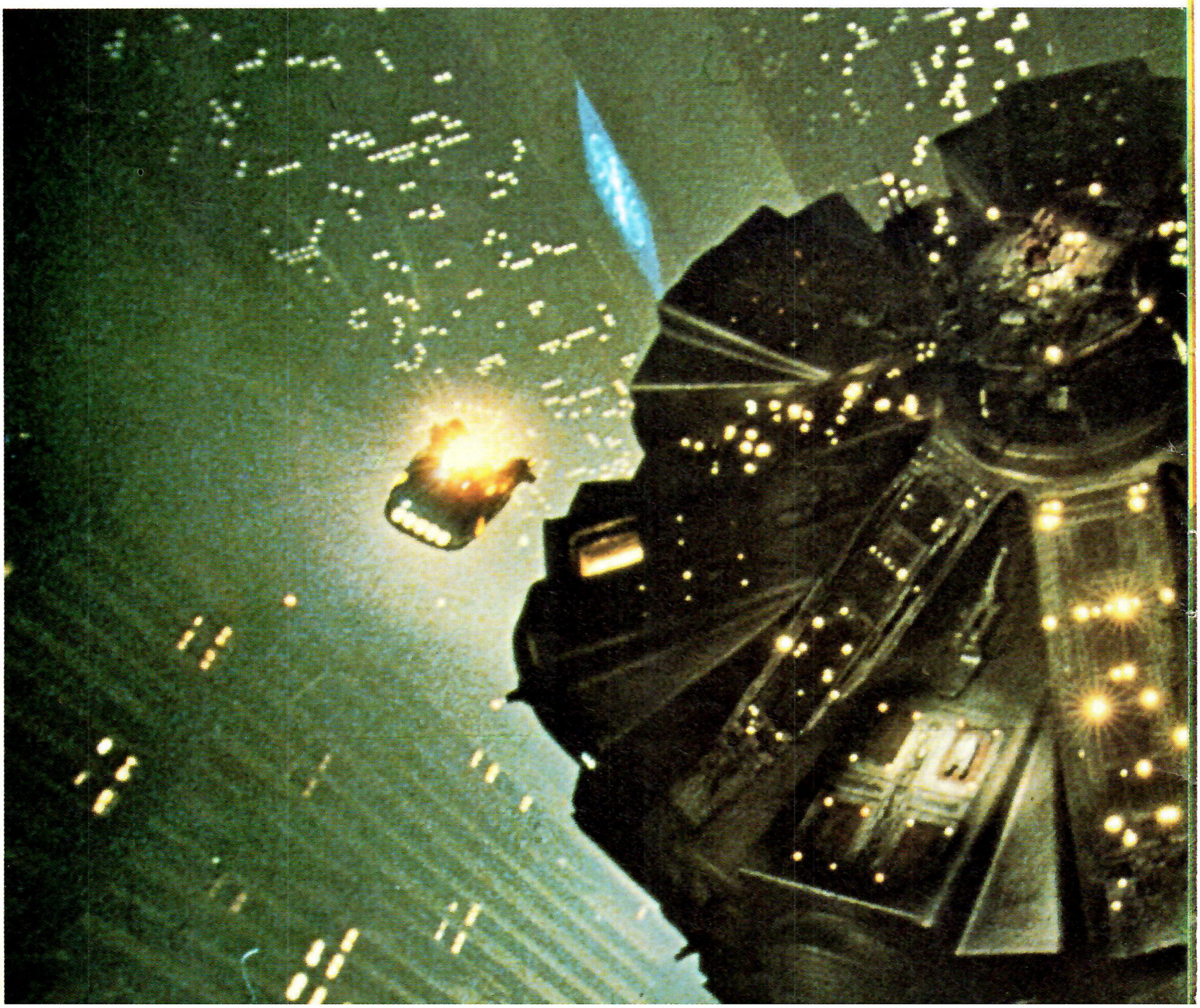

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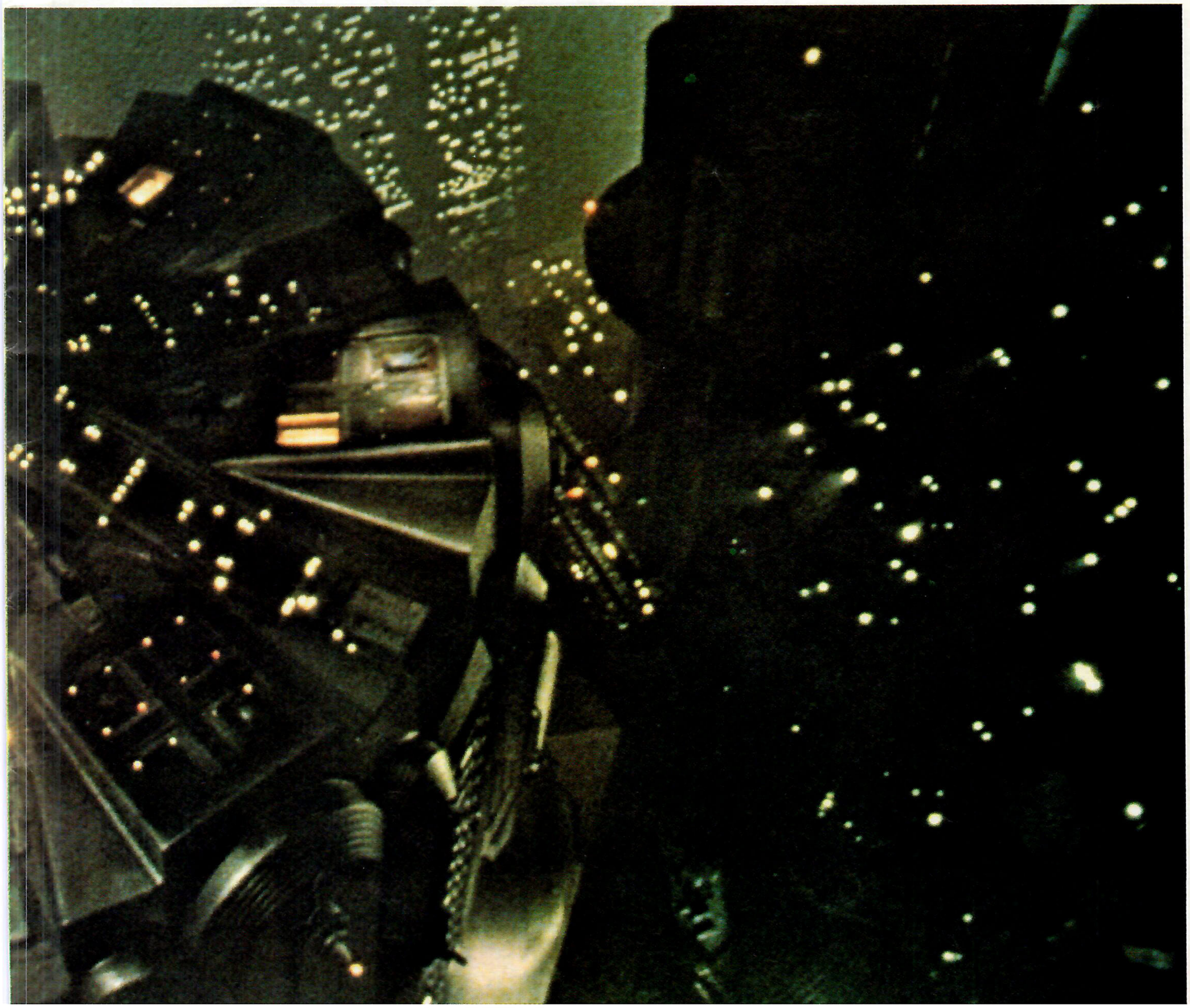

I had the impression that someone, somewhere, had tried to make the film more like *Raiders of the Lost Ark.* I hoped it wasn't Ridley Scott . . .

The film that Scott had set out to make was a sensitive and genuine science fiction fable. He and his team had created a totally believable SF backdrop for their story. The only way they could have achieved a more convincing atmosphere would have been to have waited 50 years and shot the picture on location in LA. What we had here was a film through which Scott's genius still shone, but partially masked by 'pacey' cutting and corny narration.

The true story finally came out. *Blade Runner* had been previewed in Dallas and Denver in the USA. Angry *Raiders* and Harrison Ford fans had stomped out in bewilderment when they realised that the film they had come to see wasn't 'Raiders of the Lost Androids'. At one of the screenings, can and empty popcorn packets had actually been thrown at the screen! Apparently, Ladd Company executives were thrown into panic. Here they were, $28 million of their money sunk into a science fiction would-be blockbuster and the paying public had reacted like animals. Hence the hasty re-cut and the stultifying voice-over. And that is the version on show in the United States.

Happily, I can report that after fellow *Starburster* Phil Edwards and I spoke to Ridley Scott, he turned out to be as upset at the tampering as I was. Further, Scott told us that the print released in Britain and the rest of Europe would be closer in style to that first preview I had seen. To prove his point, Scott urged us to see the final release print. With the exception of the dire narration, and the tacked on, tacky ending, the version of the film that recently opened in Britain is pretty much the same as that first preview print.

With three versions of *Blade Runner* that I know of in existence I began to wonder what had been in even earlier cuts. For example, what had been in the first print that Scott had submitted to the Ladd Company? What had earlier versions of the script been like? Using quotes from interviews that Phil Edwards and I have done with *Blade Runner* Associate Producer Ivor Powell, and director Ridley Scott, I will try to outline the various versions of the film that have been under consideration at various points during the project.

Hampton Fancher's original screenplay was based on the Philip K Dick novel *Do Androids Dream of Electric Sheep?* Dick's story was a bleak look at a future society where animals are practically extinct and androids have been built in quantity to alleviate the mundanities of physical labour. Dekard's (changed to Deckard in the film) greatest ambition is to own a real sheep, rather than the android sheep he keeps on the roof of his apartment building. It is to this end that he hunts down renegade androids for the large bounties offered. The film-makers rightly decided that it would be a bit much to expect audiences to buy this whimsical premise. Ivor Powell told us that it would, 'probably have appeared a bit stupid'.

'Hampton Fancher is a very romantic writer. In his original script the relationship between Deckard and Rachel was much stronger and in the end she realises that there isn't much future for them because he's human and she is a replicant. She is standing on the roof and he realises that she might be going to do something stupid and he rushes to her. He gets up onto the roof and she's standing at the edge holding onto the real sheep that he's bought. There's quite a moving conversation between them in which she compares how she's feeling to the old android sheep. He thinks she's going to throw the real sheep over the edge, but she hands it to him and as she does, steps back off the roof, committing suicide. A very powerful scene. He hops into his spinner and zaps out into the desert wastelands which surround the city and sets down. He is just sitting there staring at the sands when he sees a movement which, of course, surprises him as there is no real animal life except for in zoos and private collections. A tortoise crawls out of the sand and he flips it over onto his back. He watches it for hours, like from dawn to dusk, watching this little animal trying to flip itself over, and finally it succeeds and goes waddling off. This, symbolically, says to him that humanity is going to make it.'

It's interesting that the reference to the tortoise survives in the Voight-Kampf interview with the replicant Leon.

More changes

One aspect of *Blade Runner* that was filmed by Scott was excised by higher powers though vestiges of it still remain in the version on show in our cinemas. After Deckard has informed Rachel that she is a replicant he sits down at the piano in his apartment and tinkers around with the keys, his mind seemingly several million miles away. He absently peruses his family photographs lined up on top of the piano. This parallels the replicants' need to belong, displayed in their penchant for keeping photographs to strengthen their tenuous illusions of humanity. Into this scene, Scott had cut flashes, apparently from Deckard's own memory, of a unicorn cantering through a leafy glade. Earlier in the film it has been established that Gaff, the ambitious police officer, has a passion for making origami animals and leaving them behind him wherever he goes. At the end of the picture, Deckard is setting off into an unknown future with Rachel and discovers outside his apartment door crushed underfoot, an origami unicorn. The implication is that Gaff knows of Deckard's innermost secrets . . . and the only way he could know that was if Deckard were a replicant, making all of Deckard's memories mere implants. The idea that you set a thief to catch a thief pleased not the powers-that-be. And on reflection, I think that would have been too bleak an image to end the film on.

I asked Ridley Scott about the strange tattoo marks that appeared on Rutger Hauer's body during the climactic battle between replicant and blade runner. He told me that this related to another scene that was missing from the film. In the opening sequence we see (should have seen!) the replicant Roy Batty (Hauer) sitting in a space ship encased in a suit of battle armour. One by one the layers of this armour peel open until Batty is exposed, connected to his armour by a series of filament skin implants. The tattoo marks denoted the points at which the implants were attached to his torso.

Ivor Powell told us of another altogether different opening scene.

'Imagine something like the massive pit excavation in *2001* and there was a massive high-tech furnace at one end and there was this mountain of bodies which were being shovelled onto a conveyor belt and being fed into a furnace. It looked something like a load of mackerel being poured out of a trawler. And then out of this pile of bodies, emerged Batty and the other replicants. And they "cream" the workers down there. I had a vision – although it wouldn't have been possible unless the actual site was on the moon – of Batty, rather like the Moonwatcher in *2001,* looking upwards and actually seeing the Earth. He knew that was his target, his destination. It was where his creator was. The reason that that wasn't in the movie was that it would have cost a couple of million dollars to do and we already had enough footage.'

As with all scripts for movies, *Blade Runner* went through several opening sequences before reaching our screens. Ivor Powell related another variation on the opening sequence.

'That other opening scene (written by Hampton Fancher) showed a sort of farmscape – one of those mid-America endless landscapes – and a massive tractor tilling the soil. A spinner zaps in, lands and out steps Deckard. The farmworker notices him and Deckard walks towards this very old-fashioned farmhouse. Inside he looks around. There were photographs, clothes and soup cooking on the stove. The big bulky farmhand starts walking towards the house; he's about seven feet tall. The broadwalk outside the house literally sinks beneath his feet. He asks Deckard what he wants. Then he makes an aggressive move towards Deckard, who pulls his gun and blows him away. Deckard goes over to his body, heaves him over – and this is real 'Ridley-ism' – just pulls out his bottom jawbone and sees a number stamped on it. What it was, was a demonstration of what a blade runner does; the farmhand had been like a Nexus 2 or 3 that had been a runaway. Deckard had tracked him down. I'm not sure that this comes over any more because it's no longer an integral part of *Blade Runner;* that it is established that there had been runaways over the years and that was why they had to have blade runners. In the early days it was a case of tracking down these things which were not very human, and couldn't pass for human with their parchment-like faces. You couldn't see the nuts and bolts but they were primitive, so it wasn't too hard to blow them away. But (when) they became more and more sophisticated and more and more like you and me, then the job became more and more repellant. So I guess that's why Deckard went into retirement and that's the point where we catch him.'

At the end of the day I feel that the version of *Blade Runner* we see on show in our local cinema is fairly close to the film Ridley Scott and his co-workers set out to make. Certainly the tampering of higher powers is still evident. The ending which, Ivor Powell told us, consists of out-takes from *The Shining,* does nothing to enhance the picture. The voice-over, it was felt by executives, was necessary to clarify the storyline. It is not. And even if it was, wouldn't it have been possible to have found a professional writer to execute it?

All this notwithstanding, I still think *Blade Runner* is one of the finest films to be made by a British film director – of any kind. Ridley Scott can bask in the confidence that his original footage was just too brilliant to be ruined by any amount of tampering. It just goes to prove that no amount of idiocy can prevent true genius shining through. *

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THE TRANSPLANTED BRAIN

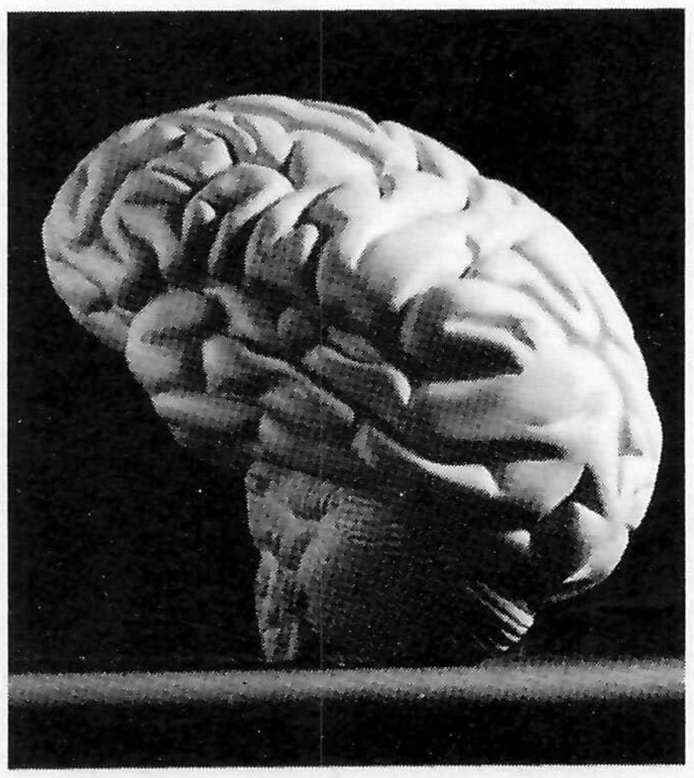
ROBIN BRIGHTWELL, CO-AUTHOR OF 'THE HUMAN BRAIN', DISCUSSES POSSIBILITIES

If someone had predicted, 50 years ago, that it would ever be possible to build a machine that could take over the functions of the human heart, he would have been labelled a crank. And if he were foolish enough to go even further and suggest that the heart could be removed from one person and be persuaded to function in another . . . Now, of course, heart transplants take place every week.

In 30 years time, in 2012, will the entrepreneurs of surgery, the 21st century equivalents of heart surgeons Barnard, English and Yaccoub, be seriously contemplating human brain transplants?

Surgeon and patient would at least be spared one of the major problems facing the transplantation of any other organ, because the body into which the foreign brain is fitted will probably not reject it. Early, unsuccessful, transplants of kidneys, before they even considered hearts, taught surgeons that the recipient had to be given potentially dangerous drugs to prevent such rejections. The brain is unusual because of the 'blood-brain barrier', a thin layer lining each blood vessel in the brain and preventing all but the smallest of chemical particles passing from the blood into the vulnerable nerve cells that will carry out the new brain's functions. This barrier means that the body may never realise, in a purely biological sense, that it has been grafted with a foreign organ since it is the larger chemicals, often on the surface of cells, which give each of our bodies a particular chemical identity and which make the task of matching heart or kidney donors and recipients so difficult.

So there may be fewer problems matching



the chemical, or biological, selves of recipient body and donor brain but when it comes to the matching of the psychological selves of the two individuals, the potential difficulties become fascinating. If you were to receive the brain of someone of the opposite sex, would you think like a man or a woman? That is, of course, if you believe that they do think differently. If the body were female, would it still produce the hormones which governed its owner's menstrual cycle? As we know from observation, as well as recent court cases, these hormones can influence thoughts and feelings considerably. Most women, of course, have learned to cope with such variations, but a man's brain would never have experienced monthly changes in hormone levels, the effects on it could be quite bizarre and might lead not only to some distressing behaviour, but some interesting legal defences! Such hormones are indeed produced by female sex organs, the uterus and ovaries, but these glands are, in turn, controlled by other glands in the brain itself, the pituitary and the hypothalamus. So the recipient female's body cycle would be totally messed up by the donor brain's hormone secretion circulating in the bloodstream and reaching every organ of the, by now, totally confused body.

For example, there is the body's own version of morphine, called endorphin. The new brain would initially go on producing its previous level of this potent pain-killer and pleasure-giver. Since it is one of the chemicals that can pass through the blood-brain barrier, it would reach the blood and pass round the body. However, this body would almost certainly have been used to a different level of endorphin produced by its original brain and, consequently, would suffer intense withdrawal symptoms. It would suffer these if the new endorphin level was low, or the somnolence of a morphine or heroin overdose, if the new brain was making more natural morphine than the old one. But perhaps, an enthusiast might argue, we could expect sophisticated ways of tinkering with body chemistry to be developed in the next decade, and that particular problem of brain transplants would be overcome. Perhaps it will be.

Outside the body

The brain is best known, and rightly so, as a collection of nerve cells which control the body by electrical signals sent out from the brain along other nerves. Signals reach the muscles and determine their movements. The main nerve bundle leaving the brain is the spinal cord, which alone contains millions of nerve fibres, each carrying a special message to one particular muscle, or alternatively carrying a signal from touch detectors on the skin towards the brain.

If this immensely complicated system of physical connections *could* be carefully cut, and then rejoined, in the recipient by a surgeon, what psychological effects might it have on the patient with a foreign brain? An American philosopher, Professor Daniel Dennett, put his mind to this problem by inventing an imaginary experiment, or thought experiment as he calls it.

He postulated a situation in which his own brain was removed, and kept alive in a sophisticated life support system. (Fortunately he did not have to decide how such a machine could be made to work; it was all purely science fiction.) The pulsating brain was wired up to a series of radio transmitters sending out the brain's instructions, which normally travel down the spinal cord. Signals would be received by sophisticated electronics built into the now empty-headed Daniel Dennett. In turn, another series of micro-transmitters inside his

Left, Professor Daniel Dennett reflects. Where is the true professor? Is he inside the brain in the vat or with the body with its head full of circuitry? Photo: Mat Irvine.
Heading, the human brain awaits the possibilities of successful transplant. Photo: BBC/David Johnson.

skull would send out signals from his eyes, ears, the touch sensors on his skin, etc., so that the brain in its vat would be kept fully informed of goings-on in the outside world.

Now where is the *true* person? Is he inside the brain in its vat? Or with the body, whose head is full of nothing more than a mass of transistors and circuits? Dennett thinks it would still feel as if he were inside the body, partly because that is where his eyes are, and all his other senses; therefore his 'point of view'. It would still feel the same as it did before the imaginary operation. But, you might say, there are no thoughts, or memories, in the body. They are all in the brain under its protective dome, thoughts must feel as if they are in there, and so 'the self' would be too. That is a more difficult conclusion to counter but if you follow Dennett's thinking, as I do, the answer is still the same.

The idea humans have of 'themselves', he argues, comes from the sum of a mass of activities of the brain and body. In other words, 'the self' is not a unit, or a lump of something physical, it is an abstraction. This is an easy enough concept to apply to, say, the equator, which cannot be seen on the ground or the sea floor, but does have an agreed location. 'The self' does not have such a location, except that it is connected with the brain and body together, and is therefore a sort of conglomerate of all our memories, thoughts, feelings, etc. The crucial point, though, is that the brain can neither receive, or send out, signals without the body. Without the body the brain is nothing. A baby's behaviour while growing up supports this, because it is only the experience of life, and the social contact that goes with it, which creates the notion of self-identity in a growing child. The idea of 'me' is not there at the beginning of life, it is not ready formed in the brain, but forms because of the input and output of that brain and the memories of it all.

Suppose that, instead of Dennett's fantasy, one's own brain has been removed and been replaced by one which used to belong to someone else. What effects would it have on the recipient? We know that a different heart in your body creates a disturbing feeling, often psychological problems. A brain would surely be much worse.

Inside the new brain will be the other person's memories – you will *feel* as if you are them. But maybe you *are* them. The memory of name, home, job, friends will be their's. Yet when you meet someone else they will think it is still you – until this chimera begins to speak. The voice will still sound familiar, but your old friends will soon realise that this is no longer the fascinating raconteur they knew, with tales of adventures in foreign parts, though still ready to listen to someone else's problems. Instead, they are listening to a dry academic with no time for anybody who does not understand the theory of Fibonacci numbers. There are indeed immense psychological problems associated with brain transplants! The idea also questions one's assumptions about the brain's contributions to all our thoughts, actions and beliefs: is there anything inside our skulls apart from a web of numerous nerve cells?

Transplant problems

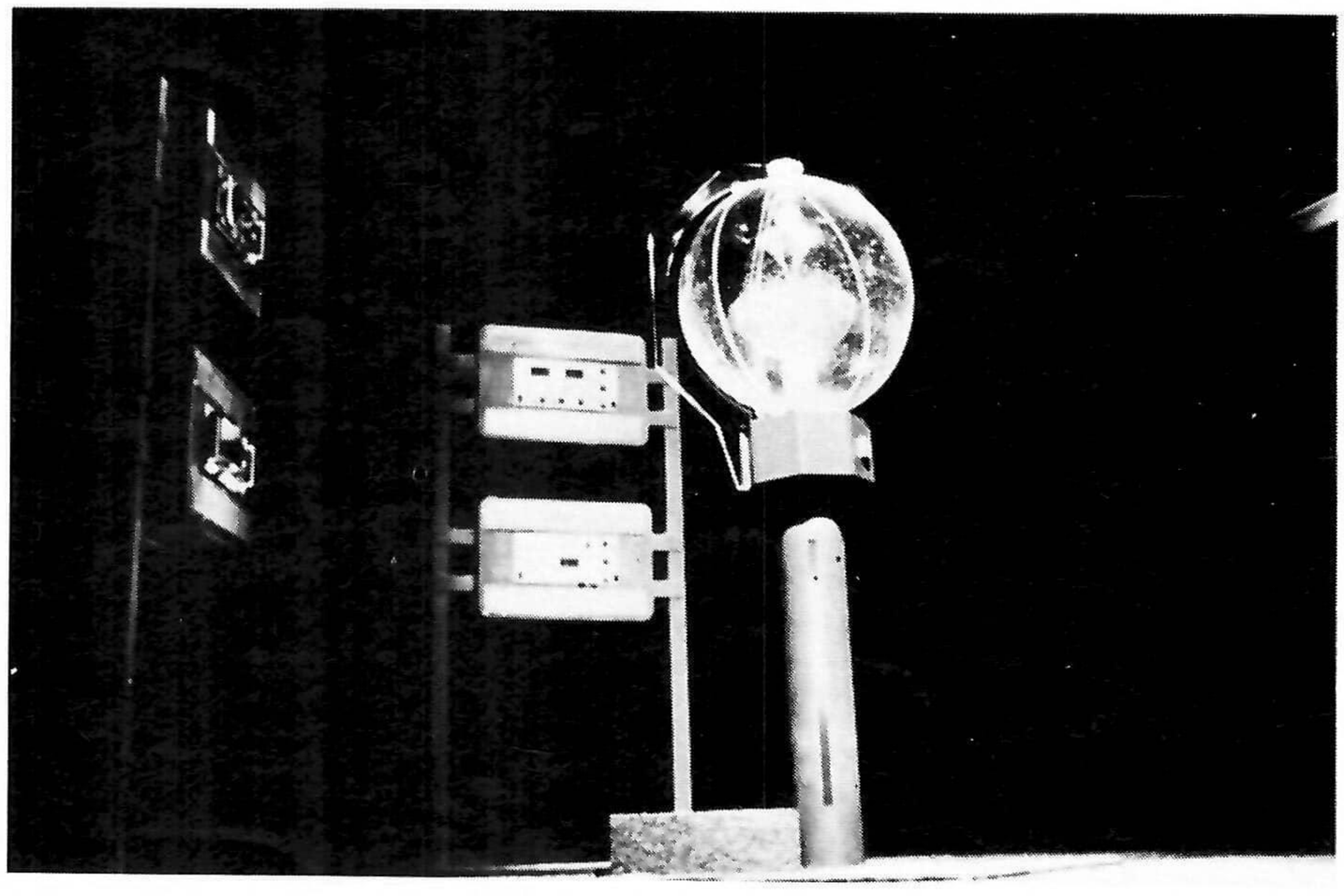
But is there any point in considering such philosophical questions when no brain transplants are even being planned? There is if the practical problems can be overcome.

Suppose the brain were to be removed; the spinal cord would have to be cut by the surgeon's scalpel, and each of the millions of nerve cells in it would thereby be severed from the brain. Signals could no longer travel to, or from, their destinations. During the transplant operation those connections would have to be restored and that presumably involves some, as yet unknown, micro-surgery, in which each nerve fibre in the new brain is joined up with the appropriate one in the recipient's spinal cord. In reality this is a gargantuan, and probably impossible, task. The idea of a brain transplant seems no more than a fantasy.

Yet there are now headlines already promising, or threatening, them and, in part at least, the scientists claiming such advances are not that far away from their first attempts. They depend for success on that most crucial and characteristic ability of living cells: their ability to grow.

It is now well established that a severed nerve in a limb will grow back along its original path, provided that the path is clear. This does not involve the formation of new nerve cells, because it occurs in adults who have long since lost their ability to grow new cells. Instead, it involves the 'sprouting' of existing fibres. They can grow over considerable distances, for example, from wrist to fingertip. The discovery that the same thing could take place in the brain raised hopes of restoring damage there too.

In Sweden, scientists have been studying one type of nerve cell, distinguished from others by the particular way in which it transfers signals to its neighbours, and by its role in the control of movement by the brain. Humans with faults in these cells suffer from Parkinson's Disease, which means that they cannot move when they want to. It is as if the 'starter motor' in their brains were broken. Once they start to move, they are usually all right. This same condition was produced in rats by surgically removing the appropriate cells. Such rats were then given an injection, into their brains, of immature cells from an unborn rat's brain. The cells were of the appropriate type, but no attempt was made to make any connections surgically. In the weeks following the injection the foreign cells actually began to grow in their host brain, protected from rejection, no doubt, by the 'blood-brain barrier' which I have previously described. Even more surprisingly, the fibres from the new cells grew to the appropriate places in the recipient's brain and restored movement to normality. It really was the first successful transplant of brain cells, and it had worked because the cells 'knew' where they were destined to go. There must be some form of chemical signalling system which encourages them to grow along the appropriate paths. When we understand that system, brain transplants will come a big step nearer. Meanwhile, in July, Swedish doctors at Karolinska Hospital, Stockholm, performed a limited form of transplant, that was successful in rats, to treat humans with Parkinson's Disease. I cannot help feeling that such treatment is like using humans as laboratory animals, and we should be very suspicious of such doctors' motives for they may well be as interested in publicity as in healing their patients. Nevertheless, perhaps the age of the brain transplant is not so far away after all . . . *



'The Transplanted Brain'. The brain in its special task wired to computers for a sequence in the recent BBC TV series. Only time will tell if brain transplants are destined to remain science fiction . . . or not. Design and photo: Mat Irvine.

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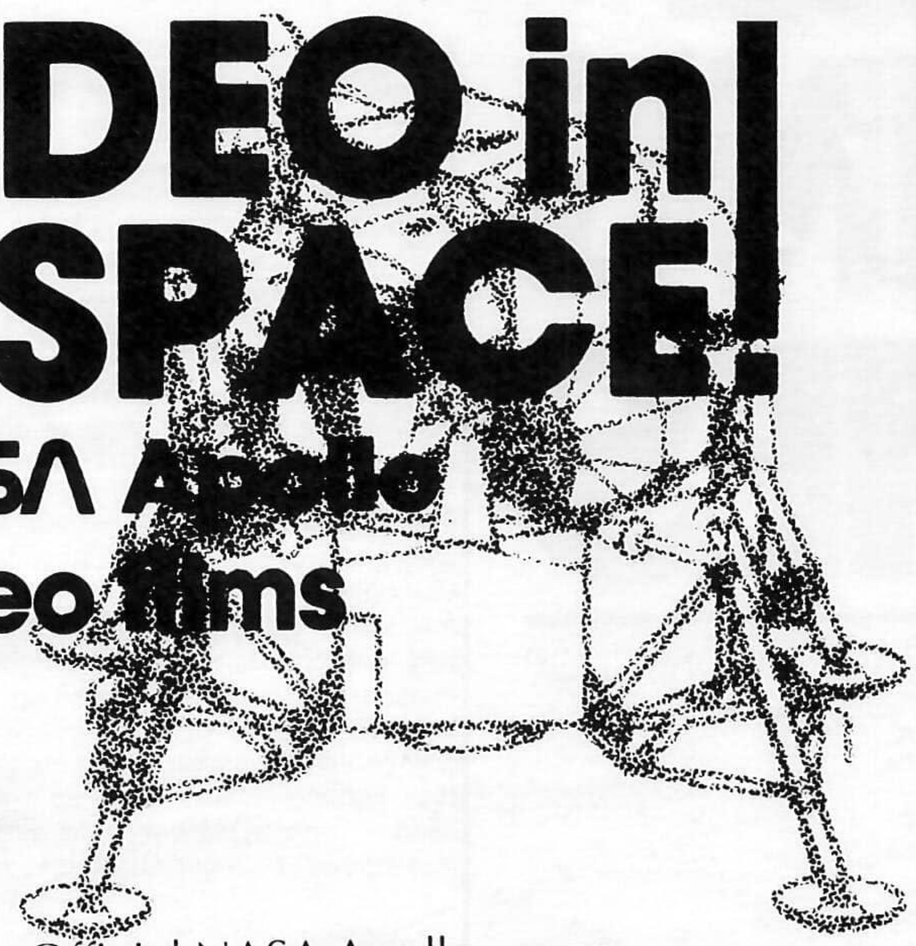

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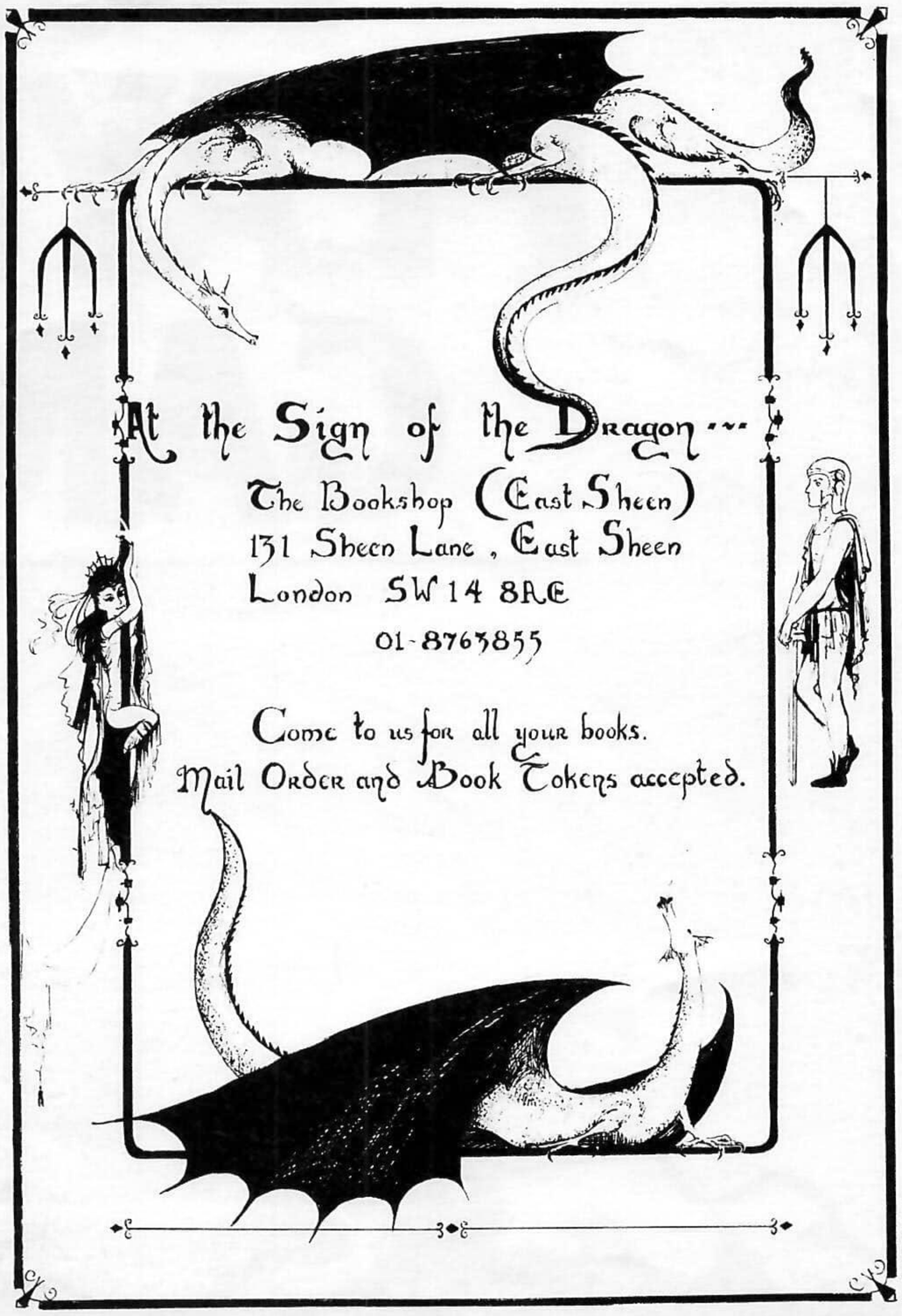
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ROLE-PLAYING GAMES

BY STEVE JACKSON OF GAMES WORKSHOP

Role-playing games, once an obscure interest known only to a handful of ardent devotees, are now played at most universities, schools and clubs throughout the country.

Having played these games it is not difficult to understand their appeal. Although all thematic games are, to some extent, simulations of the 'real' world they are based on, none are quite so realistic as the role-playing games (RPGs) for none but the RPGs allow virtually *any* plan of action to be taken by the players.

This freedom is made possible by the RPG's unique feature: The Games Master. Acting as a sort of 'god' for the world in which the game is set, one player acting as the GM arbitrates the chances of success or failure for any strategy chosen by the other players, whether covered by the rules or not.

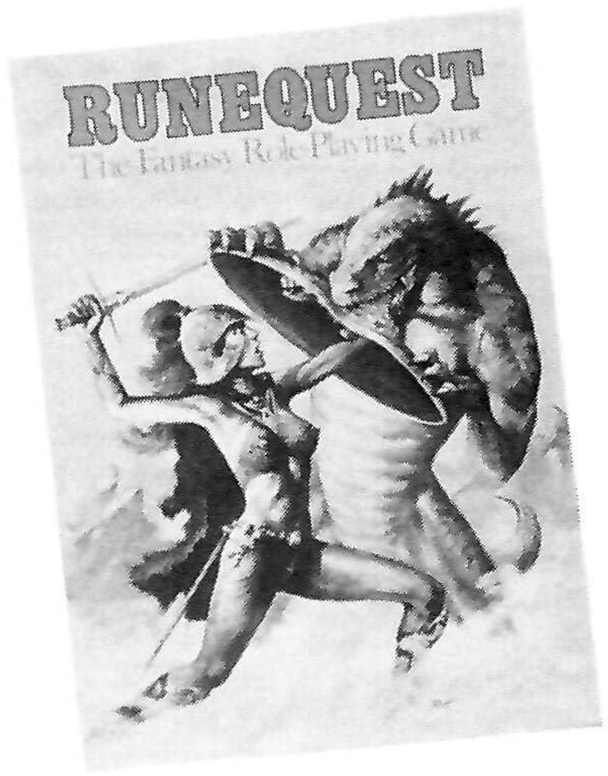
Dungeons & Dragons, the first RPG, has become a classic and aggressive marketing by **TSR Hobbies** has turned it into a mass market product in the USA. Its success has spawned a whole host of similar RPGs, some based on fantasy themes attempting to improve on D & D's weaknesses and others based on other themes. *Traveller* carried the role-playing concept into the realms of science fiction with a game conceived as a thorough and realistic world of the future. *Champions* set its world in that of X-Men, Spider Man, Superman and other super-heroes. *Worlds of Wonder,* based on Yul Brynner's *Westworld* film gives players a futuristic holiday in any of the most popular role-playing settings. Magic World (fantasy), Superworld (Superheroes), and future World (SF).

Of all these different systems, three have emerged as the current best sellers. *Dungeons & Dragons, RuneQuest* and *Traveller.*

Dungeons & Dragons

Various rumours coming from the USA (mostly it seems from the publishers of competing systems) express some concern that the publishers are now concentrating on other more mass-appeal products instead of continuing to feed the demand for accessories to their best selling system. Opinions are beginning to be voiced that Dungeons & Dragons has reached saturation point.

TSR Hobbies, the publishers, would defend strongly their own view that this is not the case. They are continuing to release new adventure modules and this year sees the release of two entirely new types of play aid: *Monster Cards,* which are full colour illustrations to be shown to players when any particular monster is encountered, and a series of *Endless Quest* books adventures in which a player may control his fate by making his own decisions at key points in the story. Indeed, I feel TSR must be excused for their 1982 releases being less prolific than those in 1981 simply on the grounds that they have now already provided all the obvious accessories and supplements. I'm sure they would welcome any other proposals players may make . . . Within the hobby there is continual nit-picking about Dungeons & Dragons, its game system, its success and the company behind the game. Yet, it is unquestionable that the rise in popularity of the hobby owes its success more to Dungeons & Dragons than to any other product. Whereas purists will continue the arguments for and against the rules systems, and philosophy behind the game, none would deny that it will continue to be the best-selling game and is everyone's natural first choice as an example of a role-playing game.



RuneQuest

RuneQuest is a rising star amongst role-playing games. Having recently been published in England, thus reducing its cost and increasing its availability, initial sales have been exceptional. In many shops it is now out-selling Dungeons & Dragons.

There are various differences between the RuneQuest and Dungeons & Dragons systems and these are most probably the main reasons for its success. To start with, RuneQuest is based in a particular world, that of *Glorantha,* a world rich in myth and culture in a continual state of enrichment by the game's authors.

When we get down to the game system itself, there are some fundamental differences. In D & D a player may begin the game as a fighter or a magic-user but fighters may not use magic and magic-users may not use most weapons. In RuneQuest, a player begins simply as a character, fighting abilities and magical knowledge are picked up during the game according to abilities and personal preferences. To give another example, D & D monsters do not have their fighting abilities impaired until they fall down dead – in RuneQuest they become gradually more incompetent as injuries build up.

Chaosium, the company behind the game, have realised the demand for Solo Dungeons based on the success of Tunnels & Trolls (another fantasy role-playing game whose popularity is almost entirely

due to the dozen or so solo adventures which can be played with it).

Solo Quest, which should be out now, is the first in a planned series of RuneQuest solo adventures.

Another reason for the appeal of RuneQuest is that its game system is modified and used in various different role-playing games from the Californian company, making it much more easy to pick up another game without too much effort. The RuneQuest base is used for their *Stormbringer,* role-playing in Michael Moorcock's world of Elric Of Melnibone, in *Worlds of Wonder* (described earlier), *Call of Cthulhu* (H P Lovecraft) and the coming role-playing version of Larry Niven's *Ringworld,* a recent licence obtained by Chaosium.

Traveller

The recent lack of new material for Traveller has resulted in a recent fall in the game's sales. But there is plenty in store for players of this best-selling science fiction game.

Game Designers' Workshop, publishers of Traveller, are currently working on producing the game in a series of five hardback books presumably designed to popularise the game through American bookshops which have had much success with *Advanced Dungeons & Dragons.* A number of supplements, adventures, and double adventures, have also been planned including *Solomani Rim,* a mapping supplement, and *Library Data (N-Z).*

Traveller is a game with a number of licensees producing playing aids, miniatures., etc, 'approved for use with' the game. A special mention ought to be made of *FASA*, a company more prolific with ship plans, adventures and the like than GDW themselves! More remarkable is the fact that the quality of product put out by FASA is high in spite of the sheer volume of material (some 20 items planned for this year alone).

A Role-Playing Games Listing

AFTERMATH!
Adventures set amongst the ruins of a post-holocaust world. Rules for mutations, modern weaponry, and survival with special options on the precise nature of the disaster causing it all. *Boxed: three rule booklets, tables and charts.*

BASIC ROLE-PLAYING
Designed specially to introduce the complete novice to role-playing games and also forming the basis for RuneQuest. Each rule step in this simple role-playing system is illustrated with examples and can be learned in half an hour or so. *Rules Booklet.*

BOOT HILL
Role-playing set in the Wild West in the latter part of the 19th century. Players can be gamblers, rustlers, outlaws, gunslingers and lawmen. *Boxed: Rulebook, introductory adventure, maps, playing counters, and dice.*

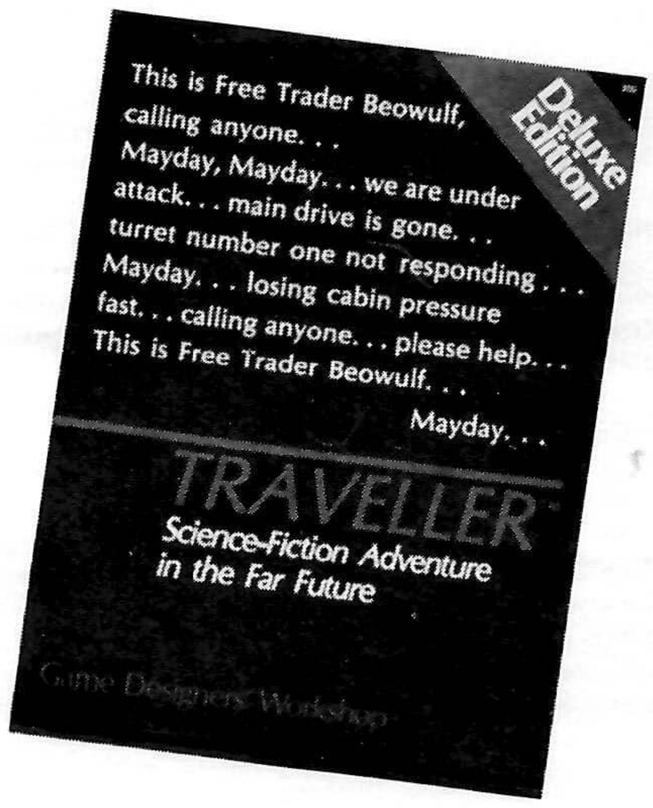
CALL OF CTHULHU
The threatening horror fiction of H P Lovecraft and his Cthulhu mythos is the setting for this role-playing game. Rules are included for *Sanity* and there is background material on the 1920's era. *Boxed: Rules booklet, introductory scenarios, background booklet, basic role-playing rules booklet, character markers, character sheets map, plans and dice.*

CHAMPIONS
The world of comic-book heroes and villains is the background for role-playing superhero and supervillain characters in this game. Highly detailed combat and character generation systems. Playing aids and adventures are available. *Rules booklet only.*

CHIVALRY AND SORCERY
Highly detailed treatment of the whole Medieval era – fact, myth and alchemy. Permits individual role-playing and the more general aspects of the feudal system, including mass pitched battles, jousting, magic, etc. *Revised version of the rules will be boxed.*

COMMANDO
Role-playing set in the modern military era – daring missions against impossible odds based on actual military raids. *Boxed: Two rules booklets, charts and tables, maps and dice.*

DAWN PATROL
Players assume the roles of Allied or German World War One pilots, fighting aerial dogfights and at-


This is Free Trader Beowulf, calling anyone. . .
Mayday, Mayday. . . we are under attack. . . main drive is gone. . .
turret number one not responding . . .
Mayday. . . losing cabin pressure fast. . . calling anyone. . . please help. . .
This is Free Trader Beowulf. . .
Mayday. . .
Deluxe Edition
TRAVELLER
Science-Fiction Adventure in the Far Future
Game Designers' Workshop

Artist: Steve Archibald

tempting to earn the 'Blue Max' or the Victoria Cross. *Boxed: Rulebook and scenarios, player counters and map.*

DRAGONQUEST
Fantasy role-playing game designed paying particular attention to combat and magic systems. Range of playing aids and adventure supplements available. *Boxed: Three rules booklets, playing aids, playing counters and map.*

EN GARDE!
Set in the 17th and 18th centuries, a game of swordsmanship, brawling, gambling and loose women drawn equally from history, the world of Errol Flynn movies, and the Three Musketeers. *Rules booklet only.*

THE FANTASY TRIP
Fantasy role-playing system usable in any fantasy setting, though a game background (the world of Cidri) is provided. Players may become a variety of human and non-human characters. The rules are modular, each element being available separately to allow players to choose the most suitable level of complexity.
Melee – Boxed: rules booklet, map, playing counters and dice.
Wizard – Boxed: rules booklet, map, playing counters and dice.
Advanced Melee – Advanced character and combat rules booklet.
Advanced Wizard – Advanced magic rules booklet.
In the Labyrinth – Game Master's rules booklet.

GAMMA WORLD
Post-holocaust role-playing. In a world of mutated plants and animals, berserk machines and roving bands of humans you must fight to survive. *Boxed: Rules booklet, map and dice.*

GANGBUSTERS
Set in the Roaring Twenties, players take on the roles of private eyes, reporters and other characters in the era of bootleggers and mobsters. Crimes are planned and must be solved. *Boxed: Rulebook, introductory adventure, sheet of playing counters, maps and dice.*

GANGSTER
Role-playing in the murky underworld of big crime. Bootleggers, racketeers, mobsters and G men fight it out to take control of the city. *Boxed: Rules booklet and playing aids.*

HEROES OF OLYMPUS
Take the part of crew of the Argo – Jason, Castor, Polydeuces, Hercules, etc., or create your own heroes to go in search of the Golden Fleece. Battle the mythological creatures of ancient legends and enlist the aid of the Gods. *Boxed: Rules booklet, introductory adventures playing counters, and dice.*

LAND OF THE RISING SUN
Highly detailed role-playing game set in medieval Japan – the Age of War and the high point of the Samurai's power. *Boxed: Rules booklets.*

MAN, MYTH AND MAGIC
Role-playing fantasy game set in the Ancient world, with an emphasis on the world as seen through the eyes of those that lived in it. Unique play-as-you-learn approach to introduce the game quickly. *Boxed: three rules booklets, introductory and advanced adventures, game master's guide, maps, charts, tables, character sheets and dice.*

MERC
Modern mercenary role-playing in historical or hypothetical missions. Referee represents *the Corporation,* your employer. *Boxed: Rules booklet, introductory adventure, reference charts, playing aids and plans.*

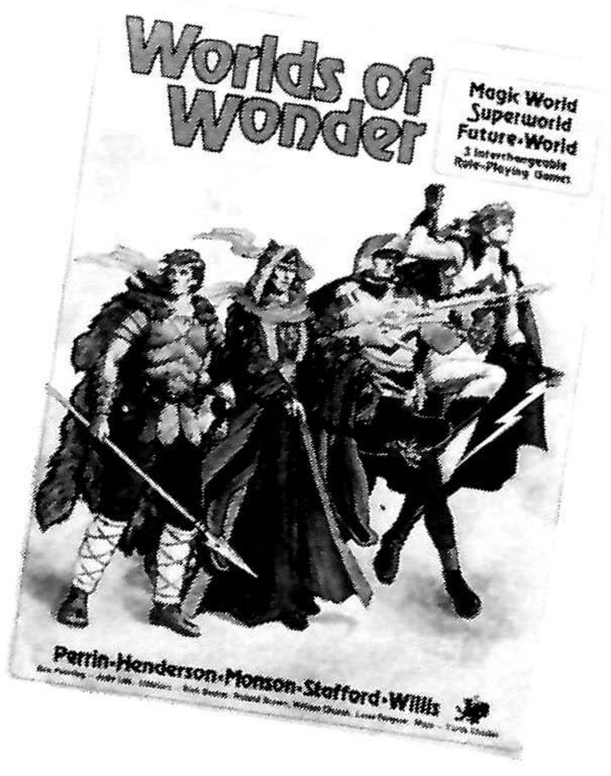
ODYSSEUS
Role-playing in the Homeric age, with the religious beliefs of the period and rules covering nautical adventuring *Rules booklet, plans, charts and reference sheet.*

PIRATES AND PLUNDER
The Golden Age of Piracy in the Caribbean. You are a swashbuckling buccaneer out for personal glory, or you may be a degenerate scoundrel out for whatever is going in this game of treasure-hunting *Boxed: Three rules booklets, adventures and dice.*

SKULL & CROSSBONES
Adventure and plunder and buckling of swashes on the Spanish Main. Includes ship movement and combat and the different types of fortification found throughout the Caribbean *Boxed: Rules booklet, ship plans, maps, playing counters, tables and charts, and dice.*

SPACE OPERA
Create your own favourite science-fiction adventures. Concentrates particularly on SF hardware-weapons, equipment and ships. World generation and complex character generation systems. *Boxed: Two rules booklets, charts and tables.*

STAR FRONTIERS
Characters equip themselves with advanced technology and survival skills, and then set forth to the stars on explorations and dangerous assignments. Human and alien player characters may be chosen. *Boxed: Basic rules, expansion rules, introductory adventure, map, playing counters and dice.*



STORMBRINGER
Set in Michael Moorcock's fantasy world of Elric of Melnibone, players may become warriors, nobles, priest or others who roam the Young Kingdoms in search of fame and fortune. *Boxed: Rules booklet record sheets, map and dice.*

SUPERVILLAINS
Places the players in a modern day New York City terrorised by villains with superpowers. Players may choose to be superheroes or supervillains, each with a choice of the type of extraordinary powers to be used. *Boxed: Rules and scenario books, maps, playing counters and dice.*

SWORDBEARER
This new fantasy role-playing system which is in modular format, concentrates on general rules systems in an easy to use format. Expansion kits take the general swordbearer system into specific fantasy areas, *eg;* Conan the Barbarian. *Components not yet known.*

TOP SECRET
A world of espionage and international intrigue. Players are secret agents who have to undertake dangerous missions against agents from other powers, terrorists and so forth. *Boxed: Rules booklet, introductory adventure, dice and map.*

TUNNELS & TROLLS
A fairly light-hearted and simplistic fantasy role-playing system having the attraction of a number of solo adventures available. A good system for the lone gamer. *Boxed: Rulebook, Solo Dungeon, Dungeon of the Bear Level 1, 6 pre-rolled and pre-equipped characters.*

UNIVERSE
Science fiction adventures in local space. The game includes an accurate display map of worlds within close proximity of Earth. Detailed space combat based on true vector movement. *Boxed: Gamesmaster rules booklet, space combat rules booklet, Adventure guide and introductory adventure playing counters, maps and dice.*

VILLAINS AND VIGILANTES
Superhero role-playing system designed to be simple and easy to play. Adventures also available. *Boxed: Rules booklet and introductory adventure.*

WILD WEST
Sun, sand and bullets in the Old West. Be a lawman, gunfighter, rancher or railroader. Fight for law and order or be a wanted outlaw. *Boxed: Rules booklet, playing aids and maps.*

WORLDS OF WONDER
Four simple role-playing systems in one box. Starting with Basic Role-Playing (qv), players can develop their characters in the fantasy setting of Magic World, the Superworld of comic superheroes and supervillains, or the Future – World of exploration, aliens and phasers. *Boxed: Four rules booklets and introductory adventures, character record sheets, character silhouettes, playing aids and dice.* *

UFOs

continued from page 52.

wide distribution. The conclusions drawn by Lawson and McCall are that experiences are the result of an unknown stimulus which causes the witness to recall, from their memory, the trauma suffered during birth. The most graphic example which can be cited with ease, relates to how the typical witness in such cases describes boarding the 'craft'. Some describe a tunnel-like effect, moving along a tunnel, then emerging into a very bright interior; others describe how a blinding flash of light hits them and then, without any delay, suddenly being inside (by implication) the object. Others, by far the minority, describe a combination of the two.

Lawson and McCall suggest that these are all recalls of memory from the witness's birth. The tunnel effect being the passage of the baby through the normal birth channel, the sudden flash representative of birth by caesarean delivery; combination cases being caused by the decision to perform a late caesarean delivery. Lawson and McCall claim a significant statistical correlation between the abduction cases and method of delivery of the witness at birth. They also claim correlation with infants born using forceps during the birth. What is more, it is suggested that the theory has the added advantage of being open to test, they say that a witness who describes boarding the UFO in a flash of light, and who was born via the usual birth channel without complication, would throw doubt onto their results.

The results of Lawson and McCall's work are as downright fascinating as they are controversial, however much doubt surrounds the idea of being able to recall memory of one's own birth; this factor alone seems to have caused their work to be excluded from a major BBC documentary due to be transmitted in a forthcoming series of *Horizon*. Certainly it would appear more feasible if Lawson and McCall had stated that the trauma was generated by birth albeit recalled through an, as yet, little understood mechanism. Perhaps in much the same way that UFO shapes, generally, are similar, despite being directly attributable to a variety of different misinterpretations.

As mentioned earlier, there are many problems to be faced when considering the mystery of UFOs; some are of our own making, others are the inherent complications of a complex enigma. Advances in our understanding are being made slowly, and despite everything, the subject is being accepted by the scientific community as something worth taking an interest in. Just one thing begins to worry me though, how will future witnesses react when we start asking them how they were born?*

CONVENTIONS

MARION VAN DER VOORT OFFERS SOME HELPFUL ADVICE

First of all, what *are* conventions? Answer: a gathering of fans, in various shapes and sizes, up and down the country at various times of the year. If you are a fan in the middle of thousands of 'Mundanes', if there seems to be no other fans around, pluck up your courage and try a convention. But be warned – they are habit forming.

How to choose a convention? Look for an author that you are interested in as Guest of Honour (GOH), or a TV show that you like, or maybe there's one just across the town from you. *Eastercon* is more or less SF only, *Fantasycon* and *Mythcon* are for fantasy fans, and there are several media, in particular *Star Trek*, conventions every year. First sit down and write away to the organisers for details, enclosing a stamped addressed envelope, please. You will receive a registration form. Please read this carefully, then read it carefully again, as nearly half of all registration forms are made out incorrectly. It will give you details of the time and place, probably the guests, how much the registration fee is, how much a hotel room will cost, and invite you to join in various competitions. It will also ask you to volunteer as a Steward, or 'Gopher'.

The registration fee is spent on hiring the public rooms from the hotel, on films and or videos, on the guests' expenses, the badges and the booklet.

A Steward's job is mainly guarding doors, so that no-one steals a painting from the art show, or enters the convention rooms without a badge. (A Gopher is so-called because he goes for this or goes for that for the Committee!) Both are handy jobs for meeting people. The competitions may range from fancy dress, through short stories, to models and painting. Just fill in the form and return it with your money, and a SAE, if necessary, for the receipt.

Time flies, and already you have to pack. What should you take? Nothing fancy unless you want to; jeans and teeshirt are fine, or a dress or suit. Something extra for the disco, and a formal outfit for the banquet if you are going. Even if the hotel has tea and coffee-making facilities you can always take extra tea and coffee; also a few biscuits. Remember that many cheap eating places are closed on Sundays. Bring any of the guests' books that you would like autographed and, of course, some extra money. There will be stalls selling books, magazines, etc., and even artwork for sale.

Guests of Honour at SF Conventions always receive a warm welcome. One among many favourites is Anne McCaffrey (above) noted author and whose latest work, 'The Crystal Singer' is reviewed on page 74.

Eventually you walk in shyly through the front door of the hotel. Near you somewhere will be the Registration Desk. Line up there, give your name, be prepared to prove your identity if necessary, and you will be given an envelope. Go to the hotel registration desk to be given your room, unpack as necessary and then open your envelope. Inside will be a badge with your name on. Put this on at once, as it lets you into the convention rooms – including the bar.

Look carefully at the other things. You will find the programme, a map of where to find things, and other items of interest – like the whereabouts of cheap food. Now pluck up your courage again and go down to the convention rooms. All those people around you wearing a badge are potential friends of yours. If you can't bring yourself to talk to anyone, try the dealers' room. Most of the dealers are quite happy to chat to anyone.

What is going on? All sorts of things; films, videos, talks, panel discussions, art shows, a disco, fancy dress entries, any or all of them. Before you know it Sunday evening comes round, and off you go, waving goodbye to all your new friends and clutching a huge bag of goodies, probably with a few addresses tucked away of people near you, or to write to.*

COMING CONVENTIONS

Please enclose an SAE when writing

OCTOBER 8-10. FANDERSON '82, Bloomsbury Centre Hotel, London. GOH Gerry Anderson. Fanderson, PO Box 308, London W4 1QL.

OCTOBER 9-10. ECONOMY '82, Hatfield Polytechnic, Herts. Economy, c/o 4, Ryders Avenue, Colney Heath, Nr. Hatfield, St. Albans, Herts.

OCTOBER 16. COMICMART, Central Hall, Westminster, London. (Opposite Big Ben) Free. Saturday afternoon only. A market only, but you can buy books, 'zines, comics, stills, etc.

OCTOBER 16. FENCON, The University Centre, Cambridge. Fencon, 27, Newmarket Road, Cambridge CB5 8EG.

OCTOBER 16-17. MIDCON, *Star Trek* Con, Post House Hotel, Leicester. GOH Bruce (Kevin Riley) Hyde. Terry Elson, 8 Ennerdale Close, Oadby, Leics.

NOVEMBER 5-7. LEONARD NIMOY CON, Albany Hotel, Nottingham. Carol Davies, 77, The Ridings, Ealing, London W5.

NOVEMBER 5-7. NOVACON, Royal Angus Hotel, Birmingham. Novacon 12, Flat 2, No. 1, Broughton Road, Handsworth, Birmingham 20.

NOVEMBER 12-14. SPACE '82, Brighton Conference Centre. The British Interplanetary Society, 27/29 South Lambeth Road, London, SW8 1SZ.

NOVEMBER 27-28. CYMRUCON 2, Central Hotel, Cardiff. GOH Lionel Fanthorpe. 28, Claude Road, Roath, Cardiff.

DECEMBER 11. COMICMART, As above for October 16.

READ OUT

ASTRONOMY

'The Dictionary of Space Technology' by JA Angelo Jr. Published by Frederick Muller, Ltd., at £12.50. Hard covers.

Not so much a book than an encyclopaedia, and a very comprehensive one at that. Over 1500 entries cover almost every aspect of the subject from 'Aberrations' to 'Zulu Time' (time based on GMT in case you didn't know; we didn't either) and right up to date with much material on the Space Shuttle. Illustrations, mostly line, are liberally sprinkled throughout with greatest emphasis on NASA material – what would we do without them?

The author not only covers present-day technology but casts his net a little wider to take in projects such as space transportation systems, space stations and industrialisation plans. Each entry is free of technical jargon and will be as useful an *aide memoire* to the scientist as it is an educational guide to the layman. A most welcome publication which has already been put to good use in the NV office. Recommended. **RLR**

'The Moon, The Sun and Jupiter.' Published by Mitchell Beazley at £6.95 each. Hard covers.

Mitchell Beazley have begun what promises to be a very interesting and useful series of astronomical books. Under the overall title of 'The Mitchell Beazley Library of Astronomical Atlases for Amateur and Professional Observers', this rather lengthy explanation leads into a series of books that, presumably, will eventually explore all the bodies of our solar system.

The series editors are our own Patrick Moore and Dr. Garry Hunt and the series includes, to date, the first three; *The Moon, The Sun* and *Jupiter*.

The Moon is, of course, written by Patrick as well – it has to be, naturally, as it is this heavenly body that he has spent a great deal of his observing life studying. Maps of the Moon that Patrick had compiled helped NASA decide on early sites for manned and unmanned exploration.

He has been assisted with maps in the book by the late Charles A Cross who had also co-authored an earlier book – in a different series – on Mars, with Patrick, and also published by Mitchell Beazley.

The Sun is authored by Iain Nicholson who has also written on this, from our point of view most important star in the sky, for this issue. Iain is senior lecturer on astronomy for Hatfield Polytechnic and has joined Patrick on many a *Sky at Night*.

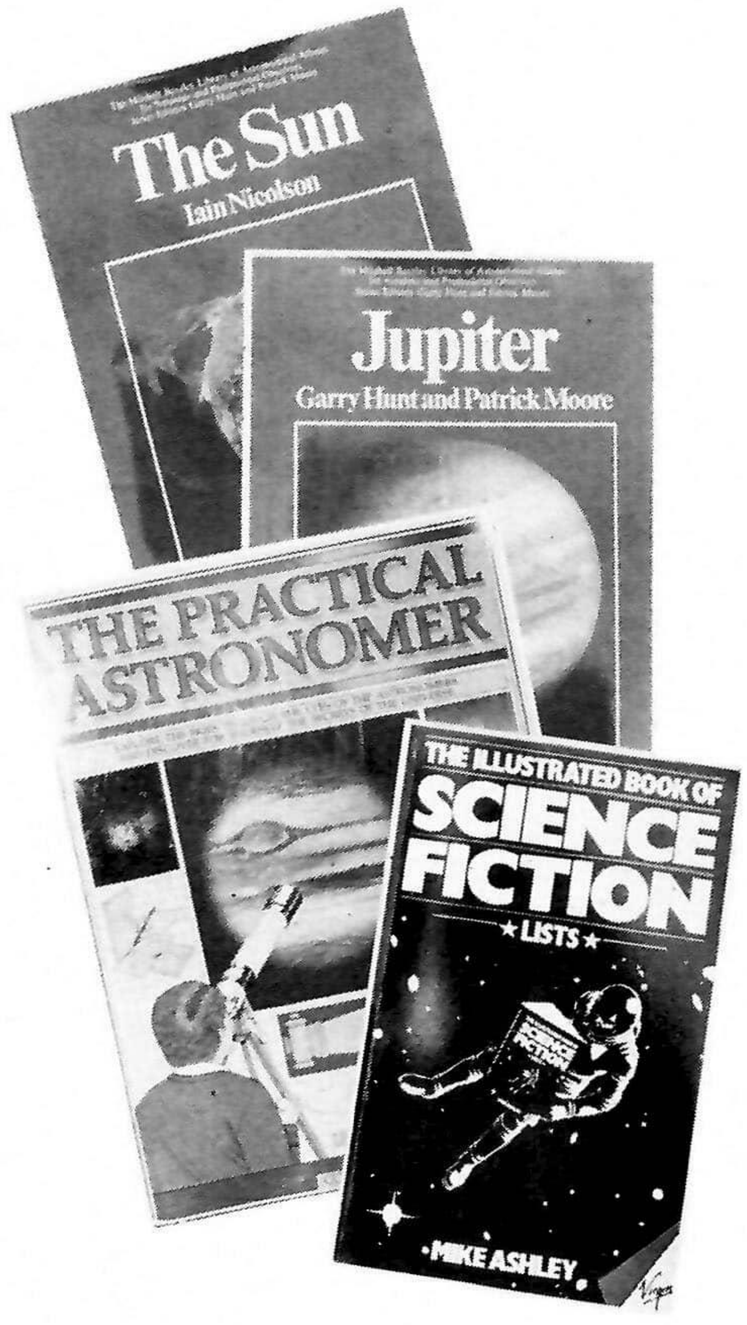
Jupiter is a joint effort between Patrick and Garry Hunt, the latter having the distinction of being the only 'foreigner' on NASA's *Voyager* imaging team. Garry was also a regular on the *Sky at Night* during the primary phase of the *Voyager* and *Viking* missions.

All the books in the series are very well produced, with many black and white photographs and drawings accompanying the thorough text and each book has 16 pages devoted to colour plates. The next in the series is Saturn, and we can presumably hope for Mars to be added later in the series. Venus also would seem a likely candidate what with all the information from the *Venera, Pioneer,* and *Mariner* 10 probes. **MI**

'The Practical Astronomer' by Colin A Ronan. Published by Pan Books at £5.95. Soft covers.

There are a great number of books on astronomy, many of which presume the reader has some knowledge of the subject already and thus tending to overlook basic essentials. Not so this publication which more than lives up to its title throughout 153 pages. Numerous experiments are described, using simple, inexpensive, equipment with practical advice on how budding stargazers can make their own observations with only basic astronomy tools. But there's much more to the book than this.

Main chapters cover the Sun, Stars, Moon Planets, Comets and Meteors, Atmospheric



Astronomy, The Milky Way and Gravity not to mention a comprehensive appendix with lists of addresses, a bibliography and tabular data on many aspects.

Illustrations abound and as well as including clear photographs of celestial bodies, the book also provides a vast number of diagrams to assist lay readers in making easy observations in the night sky. As an initial text on the subject the book is a good one; it also reads well which is not always the case in a semi-technical work of this nature.

Amongst the more useful topics discussed by the author are those concerned with purely practical explanations. Sections on the optical principles of telescopes and binoculars, how to build a planetary plotter, or how to construct a trigonometrical parallax to measure stellar distances will all add greatly to the reader's understanding and encourage him, or her, to delve deeper into a fascinating subject. **RLR**

'Sputnik to Space Shuttle' by Iain Nicholson. Published by Sidgwick and Jackson at £7.50. Hard covers.

With October 4 marking the 25th anniversary of the space age, it's hardly surprising that a book has now appeared covering the most important events. Authored by Iain Nicholson, *Sputnik to Space Shuttle* covers man's early attempts to put artificial satellites into orbit, the unmanned probes to the planets and the so-called space race to the Moon and manned landings. A good, factual, book packed with information and at a reasonable price. **MI**

'The Traveller's Guide to the Solar System' by Ron Miller and William K Hartmann. Published by MacMillans at £4.95. Hard covers.

A few years ago there was a proliferation of artists' and writers' views on our solar system and beyond; there was Isaac Asimov and Robert McCall, Patrick Moore and David Hardy, Arthur C Clarke and Chesney Bonestell. Now we can add Ron Miller and William Hartmann to the list, albeit with a slight difference, as both paint and, presumably, both have supplied the words.

Ron Miller has acted as Space Art Adviser for *Starlog* magazine and the sadly-missed *Future Life,* as well as being Art Director at the Smithsonian Institution. Astronomer William K Hartmann's primary interest is in planetary evolution, and together they have devised this 'Traveller's Guide'.

What is particularly useful about the book is that it is virtually all in colour, with paintings by the two authors complementing the latest NASA photographs. Examples of all the planetary bodies of the solar system are represented; planets, satellites, asteroids and comets, and even though we now have excellent pictures from the *Voyager* craft this hasn't meant that artwork of other aspects of Jupiter and Saturn, and their retinue of satellites, isn't valid. **MI**

SCIENCE FICTION

Reviews by Marion van der Voort unless otherwise accredited.

The outlook for both readers and reviewers gets more depressing every month as the number of books printed, and re-printed, lessens. If America, admittedly with a far larger population, can support at least six publishers concentrating on the SF and fantasy field, surely Britain can do better than a few short lists from the more imaginative publishers? There *are* rays of light in the darkness, **Severn House** and **Greystoke Mowbray** for instance, but on the whole the future is very gloomy. But let's get on with the books while there are still some around to review!

'The Crystal Singer' by Anne McCaffrey. Published by Severn House at £6.95. Hard covers.

This has been rewritten by Anne from the original serial in Roger Elwood's 'Continuum',

and has a simple story. Killashandra Ree, a woman with a genius-type temperament, finds that she is not blessed with a genius-size talent in her chosen profession. Suddenly she gets a second chance for a demanding, arduous, perilous career on a planet that would have been dismissed as unbelievable in less able hands. The planet is fantastic, almost a living organism that draws its exploiters back to be victims, but the star of the book in every way is Killashandra, with faults and virtues, a vivid personality who engages the reader's interest at once and holds it to the end. Incidently, I hope that this isn't the end; I could bear to read more about that planet and its crystal singers.

'The Many Coloured Land' and 'The Golden Torque' by Julian May. Published by Pan Books at £1.75 each. Soft covers.

These books are the first two in a trilogy by a new novelist, who has tackled a difficult task. It is the year 2110, Man has reached the stars, found other aliens who are friendly and most problems, including old age, have been solved. Even the misfits can take a one way trip to Pliocene Earth, 6 000 000 years ago, although none of them realise that prehistoric Earth is not as empty as it should be. We follow a group of people who take this option, for various reasons, and watch as they fit, or attempt to destroy, the world they find. The books are rather slow in starting, but do persevere, as Julian's mish-mash of science and fantasy is fascinating, and if the third volume to come is able to reconcile the discrepancies the trilogy will be worth remembering.

'The Black Lion' by Patricia and Lionel Fanthorpe. Published by Greystoke Mowbray Ltd., at 95p. Soft covers.

This is a traditonal sword and sorcery yarn, based on the style of Burroughs and others. The Black Lion and the Golden Tiger are King brothers, reborn alternatively. But the Black Lion, due to dirty work by the villians, is reborn on Earth instead. He manages to make his way back home, through Zotala the Priest, and this first book tells of his arrival. It isn't a great book, but very enjoyable with action on evey page. I am the more impressed because Lionel has published this himself; I wish that more authors had his courage and tenacity.

'The Essential T C Lethbridge' edited by Tom Graves and Janet Hoult. Published by Granada at £1.95. Soft covers.

The late T C Lethbridge was a pragmatist with an open mind, imagination and curiosity. Trained as an historian and archeologist, he turned his attention to parapsychology. One day I hope that his works will be republished in full, but this short book does give you a guide to his methods of approaching an unknown subject by experiment first, theory later.

'The Illustrated Book of Science Fiction Lists' by Mike Ashley. Published by Virgin Books at £2.95. Soft covers.

Definitely a book worth getting just to dip into from time to time. It gives most popular novels, writers, artists, etc., as well as many facts about writers and their preferences. I was delighted to learn, for instance, that Roger Zelazny was turned on to SF and fantasy by Doctor Doolittle as I travelled the same road.

'Star Trek. The Wrath of Khan' by Vonda N McIntyre. Published by Futura at £1.25. Soft covers.

The book of the film although devoid of a colour plate section that enriched the 'tie-in' publication of ST-TMP. There are several scenes and characters in the new title that do not appear in the film and the dialogue also differs quite markedly in many respects. If you enjoyed the film, you'll probably enjoy the book although, personally, I preferred the author's previous *Trek* novel, *The Entrophy Effect.*

Greater insights into the new characters are explored and the story itself is generally

unpretentious. Interesting, rather than gripping, but I did see the film first so the book was rather an anti-climax. A good enough read but there are better *Star Trek* novels around although not, by comparison, as readily available. Doubtless the film's success will expedite rapid new editions from certain quarters. **RLR**

'Opus – The Best of Isaac Asimov'. Published by Granada at £2.50. Soft covers.

This is a selection from Asimov's first 200 books, and the subjects covered are necessarily diverse, from straight astronomy to woeful jokes and puns. Many of the books mentioned are either out of print or have never been printed in this country, and the compendium is obviously bitty. But it is worth reading, if only to appreciate the range of scope of a man known generally only for his SF and Science Fact books.

'Doctor Who and Warriors' Gate', 'The Keeper of Traken', and 'The Leisure Hive'. Published by Target Books at £1.25 each. Soft covers.

Yet more of the novelisations of the TV scripts, and at ony 124 pages long hardly a bargain, especially the contribution by Terrance Dicks, *The Keeper of Traken.* However *The Leisure Hive* by David Fisher is better and *Warriors' Gate* by John Lydecker, the best that Target Books have produced for a long time.

'Blade Runner' by Philip K Dick. Published by Granada at £1.50. Soft covers.

The late Philip K Dick's 1968 SF classic *Do Androids Dream of Electric Sheep?* re-named *Blade Runner* for the brilliant new Warner film and also for this new edition tie-in. The original story evolves around Rick Dekard, a 21st Century bounty hunter, who seeks out renegade replicants. The assisgnment involves Nexus-6 targets and, as a result, Dekard soon finds himself involved in a nightmare of terror, violence and subterfuge where the hunter becomes the hunted.

The book differs greatly from the film, adequately covered elsewhere in this issue, and it may, or may not, be an advantage to see the film first. The book enjoyed much critical acclaim after initial publication and it remains one of the author's finest works. Dick, who died in March of this year, wrote over 30 novels and, in 1962, won the Hugo Award for his classic novel of 'alternative history', *The Man in the High Castle.*

'Blade Runner' was the first Dick novel this reviewer had encountered and, after a slow start, got to grips with the story which turned out to be an enthralling read. Such a shame that the author didn't live long enough to see his creation enjoy the cinematic success it has become. **RLR**

'The Warlock of Firetop Mountain' by Steve Jackson and Ian Livingstone. Published by Puffin at £1.25. Soft covers.

The game of the book or the book of the game. An intriguing little publication that will provide role playing enthusiasts with an opportunity to pit their wits against two of the pastime's most well-known exponents. *Warlock* is a true fantasy adventure in which the reader is challenged to find a sorcerer's hidden treasure trove. In order to do this he must run the gauntlet of dangerous traps and false clues, not to mention a deadly assortment of orcs, dragons, dwarves and vampires. Readers must overcome these daunting obstacles or perish in the attempt!

To enjoy the book's full potential, readers should involve themselves totally with the concept and can choose several courses of action as they proceed. These will take many paths leaving him, or her, to enjoy many brushes with evil before finally finding the correct route to the treasure. But that's not the end of the story for an exciting competition is also involved.

READ OUT

Readers who are able to draw the complex of passages and rooms beneath Firetop Mountain, by virtue of following all the clues provided in the book, have the chance to win a unique prize. In collaboration with **Games Workshop,** a special competition is being held by **Penguin Books, Ltd.** Judges are seeking the most accurate map, with presentation and decoration being taken into account, and the outright winner is in line for the largest fantasy figure ever produced. It's the superb *Imperial Citadel Dragon* created, and fully painted, by world famous designer twins, Michael and Alan Perry for **Citadel Miniatures.** Although a limited edition of 500 of these models is planned, the winner's prize will be unique; the only example to be specially prepared by the artists which will come complete with an official certificate of authenticity. 100 runners-up will recieve Games Workshop fantasy games and further details can be obtained by seeking out the Puffin advertisement elsewhere in this issue.

Publication of *Warlock,* and the special tie-in competition, will doubtless encourage many newcomers to the world of fantasy role-playing and offer a stimulating challenge to those who are already hooked. We're only sorry the competition rules do not allow us to participate – we'd *love* that dragon! **RLR**

Mirador Publications' 1983 Calendar

The world of fantasy art is a rich one, artists such as Frank Frazetta, Boris Vajello, Roger Dean, Rodney Matthews and Chris Achilleos enjoy a wide audience due to their incredible visionary imagination and superb artistry. Now a dozen new Rodney Matthew artworks are being made available on a terrific 1983 calendar produced by **Mirador Publications** of Bristol.

Several titles include some of those used in Michael Morcock's *Elric at the End of Time* together with some recent works for book jackets and LP covers. The majority of the calendar's prints have not been published elsewhere before, measure 420 mm x 425 mm, and are printed in full colour on high quality art paper. After use they can, of course, be framed and will delight all fantasy lovers. A superb collection of one of our best artist's finest paintings and most reasonably priced, too, at £5.95 (including VAT). Finally, in a generous gesture by the publishers, the first 500 sold to *New VOYAGER* readers will be autographed by Rodney Matthews himself. Well, what *are* you waiting for? **RLR**

GENERAL INTEREST

'The Complete Handbook of Video' by David Owen and Mark Dunston. Published by Penguin Books at £4.95. Soft covers.

One of the more difficult questions regarding the purchase of video equipment for the first time is not so much, 'what will it cost?' but, 'which?'. These nagging doubts, along with scores of others, can be cured by a careful read of Penguin's video handbook. In over 200 pages the authors explain how video recorders operate, outline their capabilities and their limits, deal with troubleshooting, suggest ways of making your own video films and all supported by superb graphics and colour illustrations.

Practical examples of filming scenes, recording from TV, and how to understand the varied functions of the equipment and back-up facilities are just part of this extensive guide. The emphasis of the contents seems to be firmly placed on making one's own video films. All the tricks of the cinematic trade are revealed so that the amateur cameraman can get the very best out of his equipment.

Other aspects covered by the book include video games, video computers and how to build up a tape library. The utter confusion of copyright laws, coupled with legal and illegal recording, is sorted out ably and other chapters examine the available systems and the various types currently available on the market. If you are contemplating the acquisi-

HOW TO WIN AT
PAC-MAN
The Book that Gives You All You Need to Challenge the World's Most Popular Computer Game!
HOW TO MASTER
HOME VIDEO GAME
NEW SECRETS!
THE VIDEO MASTER'S GUIDE TO
PAC-MAN
BY JIM SYKORA & JOHN BIRKNER
DRAMATIC PHENOMENA FROM THE NEW FRONTIERS OF SCIENCE
OMNI'S
CONTINUUM
EDITED BY DICK TERESI

tion of video recorder and/or camera make this book your first purchase, and take the trouble to read it *thoroughly* before choosing. **RLR**

'How to Win at Pac-Man' by the editors of 'Which' Consumer Guide. Published by Penguin Books at 95p. Soft covers.

Undoubtably the most popular arcade and home video game at present, *Pac Man* is as far removed, in its complexity, from *Space Invaders* as Space Invaders is from the original tennis games. These two factors have led people who mastered the game to write books in order to help us lesser folk. This small 32 page booklet has many colour diagrams to back up the brief text. Subjects cover the basic elements, game pattern variations, suggested routes to take, and several handy tips to foil the ghosts.

Also included are small chapters on spin-offs of the original game: Ms. Pac-Man; and Mrs Pac-Man; and the **Atari** Home Video system. **SA**

'The Video Master's Guide to Pac-Man' by J Sykora and J Birkner. Published by Bantam Books at 95p. Soft covers.

One of this book's authors, J Birkner, has amazingly scored 3 214 270 and has taken the Pac-Man arcade game to its logical end where mass confusion occurs – technically beating the computer. This booklet contains 84 pages dealing exclusively with the arcade game and the text goes into the programme in some depth backed up with many illustrations. It would certainly take many hours of studying to memorise all the different routes to take for each variation of this popular game. **SA**

'How To Master Home Video Games' by Tom Hirschfield. Published by Bantam Books at £1.50. Soft covers.

As a follow-up to his previous publication, *How To Master The Video Game,* this 200 page book deals with a number of the more popular home game programmes produced by **Atari, Intellivision** and **Activision,** the latter of whom also make cartridges for use on the Atari console.

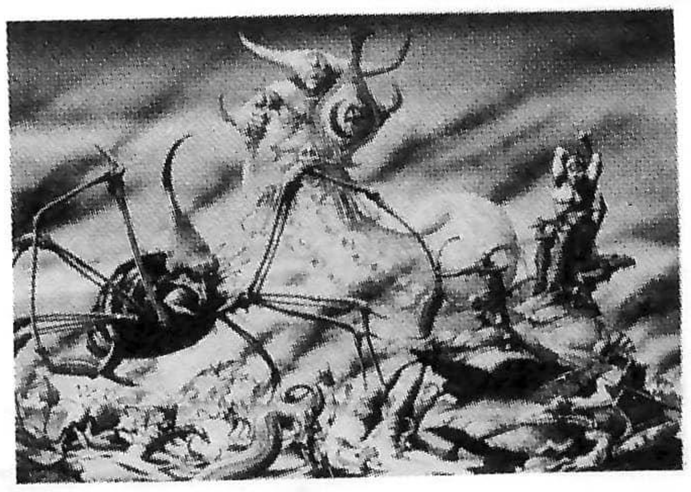
Each game is itemised with an explanatory diagram, control functions, scoring, the 'dangers', observations and strategies on the best way to play. It's a handy book in many ways, not only if you already own a game console, but also if you are thinking of buying one. It will give a good insight into the two major systems available and their programmes. **SA**

'The Human Brain' by Dick Gilling and Robin Brightwell. Published by Orbis at £8.95. Hard covers.

I have to admit to a slight bias towards this book, which is based on the BBC Television series, as I worked on the programmes and also received a credit in the acknowledgements! However, I still reckon they did a good job, both with the series and this book, with what could have been a weighty subject considering it was spread over seven episodes.

The book follows much the same pattern as the TV programmes, covering aspects such as Memory, Language, Seeing, Movement, Fear, Madness and Consciousness. It takes you through the modern thinking of each and is well illustrated with colour and black and white photographs plus many line drawings.

I remember having a conversation with Robin Brightwell during the making of the programmes; we were discussing the name that the series would carry. There were many on the list, at least 30, including the name it was finally given. My favourite however, although Robin and Dick felt it could have had other connotations and consequently rejected



One of Rodney Matthews' striking works from the Mirador 1983 calendar, a must for all lovers of good fantasy art. Picture by courtesy of Mirador publications.

it, was 'The Soft Machine' which I felt fitted perfectly! Robin Brightwell writes more about the human brain elsewhere in this issue. MI

'OMNI's Continuum' edited by Dick Teresi. Published by Sidgwick and Jackson at £5.95. Soft covers.

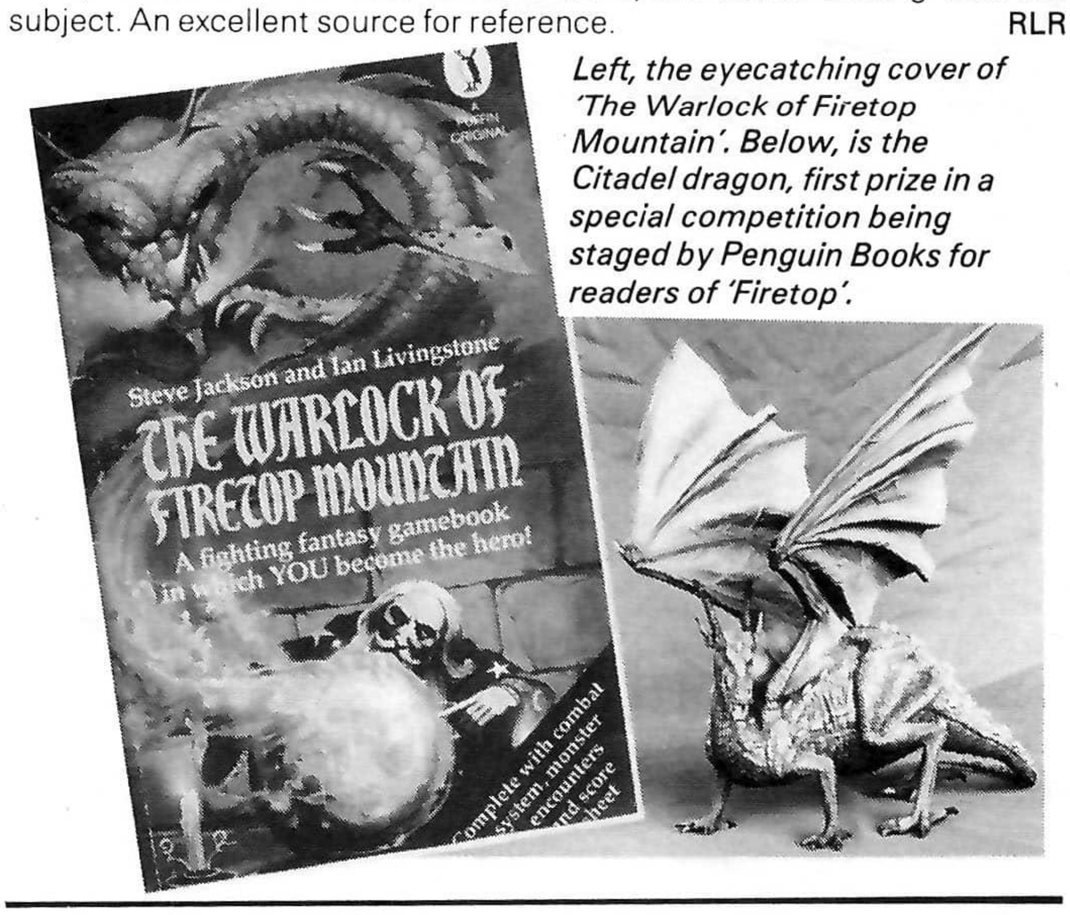
Anyone who's ever taken a casual glance at *OMNI* will probably have noticed its silver pages. These contain probably the most interesting part of the magazine, and along with the puzzles, is my personal favourite section. *Continuum* consists of snippets of useful, and sometimes useless, information interspersed with quotable quotes from both likely and unlikely sources. Many of these have been collected from the past four years of the magazine's publication and brought together in book form. Published by Sidgwick and Jackson in the UK, and compiled by *OMNI* editor, Dick Teresi, it's the sort of book you intend to just dip into but end up cancelling all engagements until you've finished it! MI

'The UFO Encyclopaedia' by Margaret Sachs. Published by Corgi/ Transworld Publishers, Ltd., at £4.95. Soft covers.

There's plenty of controversial material to be found in this weighty tome with its exhaustive (over 500) alphabetical entries from 'Abductions', through celebrity eyewitnesses, UFO publications, organisations, photos and worldwide sightings, to 'Zond 4'; a Russian probe launched in March, 1968, and which triggered off a spate of 'UFO' reports.

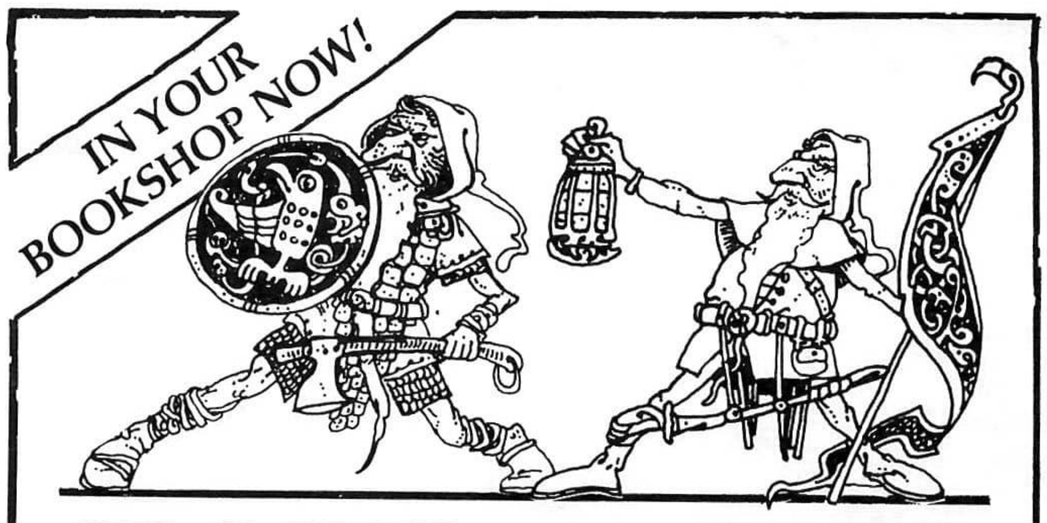
Most all of the 'classic' encounter cases can be found within the book's 400 plus pages, most of the more famous – or is it infamous? – photographs are reproduced and there are plenty of supplementary appendices listing out UFO groups and society addresses worldwide.

Fact or fiction? It is that basic question in regard to the UFO phenomenon which makes the subject so fascinating to so many. The author of this recent addition to a mountain of UFO literature should be applauded for producing such a useful guide without reverting to the cheap sensationalism that all too often spoils books dealing with the subject. An excellent source for reference. RLR


A PUFFIN ORIGINAL
Steve Jackson and Ian Livingstone
THE WARLOCK OF FIRETOP MOUNTAIN
A fighting fantasy gamebook in which YOU become the hero!
Complete with combat system, monster encounters and score sheet

Left, the eyecatching cover of 'The Warlock of Firetop Mountain'. Below, is the Citadel dragon, first prize in a special competition being staged by Penguin Books for readers of 'Firetop'.

REVIEWING BOOKS FOR THIS ISSUE WERE: STEVE ARCHIBALD (SA), MAT IRVINE (MI), MARION VAN DER VOORT (MV) FROM 'AT THE SIGN OF THE DRAGON', AND RAY RIMELL (RLR).



THE WARLOCK OF FIRETOP MOUNTAIN

by Steve Jackson & Ian Livingstone

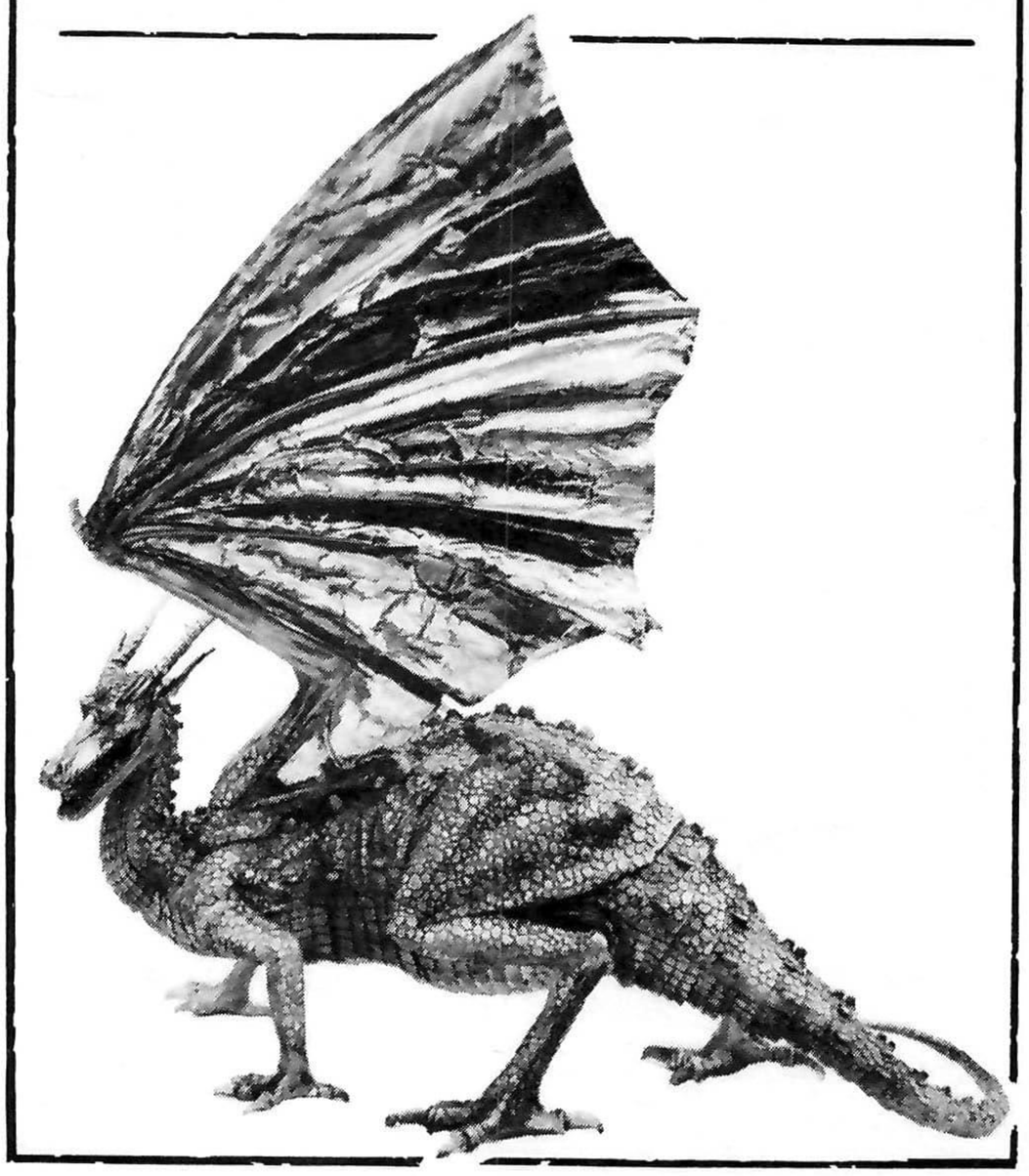
Puffin Books £1.25

A Solo Fighting Fantasy Gamebook complete with Monster Combat Systems!

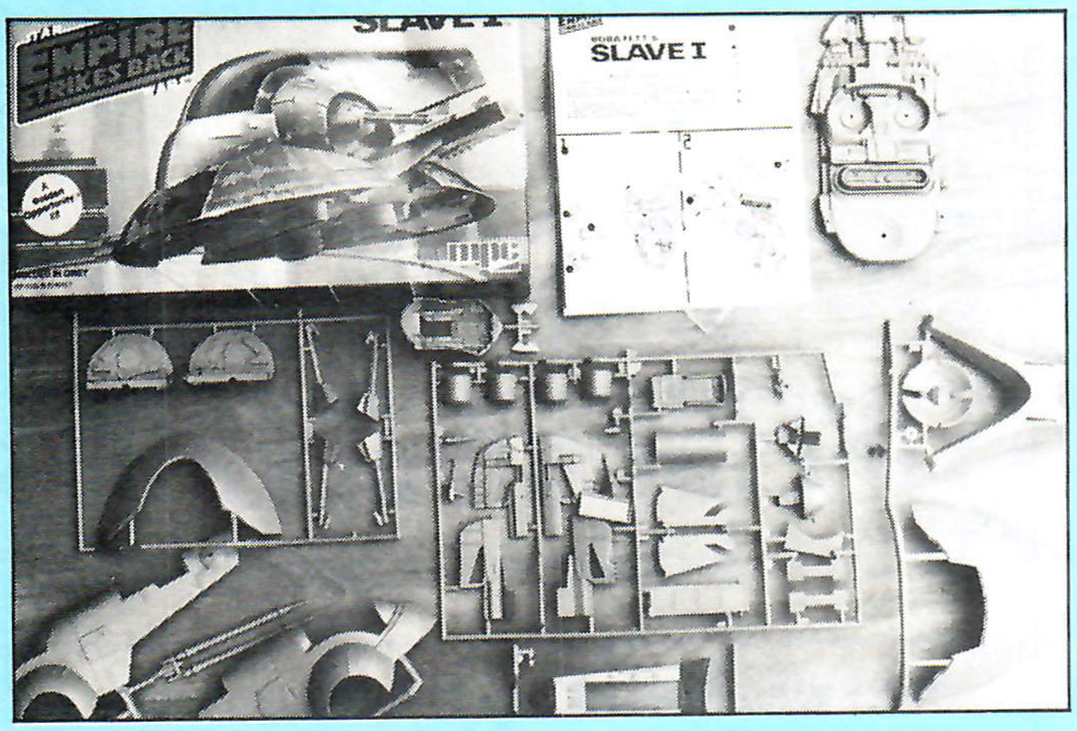
YOU are the hero in this gripping multi-option adventure as you battle your way to the Warlock's treasure.

PLUS — don't forget to enter our Warlock competition. First prize is the largest fantasy figure ever produced — The Imperial Citadel Dragon plus 100 runner-up prizes of Games Workshop fantasy games.

More details from Barry Cunningham, Penguin Books Ltd., 536 King's Road, London SW10 Tel: 01-351 2393



PRODUCTS



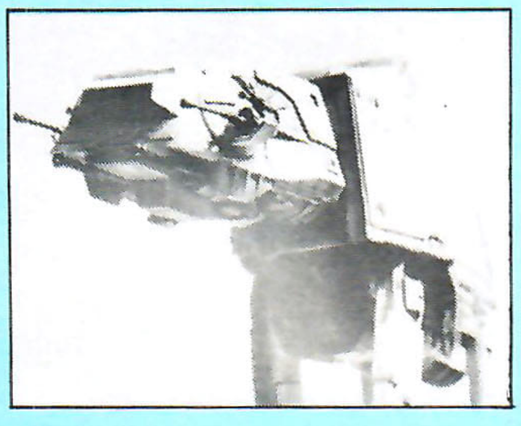
AIRFIX

MPC have certainly done the *Star Wars* saga proud and all of their kits inspired by this cinematic extravaganza, perhaps with the exception of the *Imperial Star Destroyer,* have been faithful little reproductions of the originals – whatever the originals were! Recent releases are no exception and the **MPC/Airfix** *AT-AT,* or to give it its full title – the *All Terrain-Armoured Transport* – is top contender for the best so far.

The model works out roughly to between 1/72nd and 1/75th scale. Construction is simple enough, with sufficient parts to make it interesting but without taxing the novice too much. Working features are limited to a neck joint involving the use of an elastic band, which allows the 'head' to be realistically positioned, and the four legs. However, only the front pair are jointed at the knee (the back just swivel from the 'hip') and two kits would allow a more authentic replica for, otherwise, the legs are identical. Two tiny *Snowspeeders* are also included and although I'm not entirely convinced that their scale matches that of the *AT-AT,* they don't seem too far out and will fit into dioramas fairly convincingly as proven by our managing editor elsewhere.

With any of these kits the model is made, or not as the case may be, by the finish. Consulting pictures from the film (and there is at least one printed in this issue) will reveal that the *AT-ATs* were hardly in showroom condition. The look of these, and other such craft/vehicles, results from the process generally known as 'dirtying down'. It isn't a case, as often thought, of splashing a bit of black paint around. There's much more of a science about it, and the process can take a long time, probably longer than the construction of the basic model itself. For a start you need to decide just where the object would have picked up the dirt or rust, etc. (This is equally applicable to a scratch-built model or a kit.) Scale also plays a large part, and attempting to make a model of a large craft – such as the *Star Destroyer* – will also be considerably harder than one of a scale of, say, the *AT-AT.*

As an alternative to pastels here's some suggestions for weathering using enamels. Recesses, such as those found in the legs of the *AT-AT,* are going to be a prime source for weathering, as are the tiny details on the main body. A thin wash of paint, not necessarily just black – a mixture of black, brown and red works much better – can be run into these areas, following the line of the moulded recesses. And it's quite a loose mixture, rather like coloured thinners! Details can be picked out in various shades of the main colour, for which **Humbrol** *Matt Light Sea Grey* works best; metallic shades, such as Humbrol *53* and *56,* are also very useful. Larger areas, such as those on the main body, can be dirtied with a 'dry-brush' of a

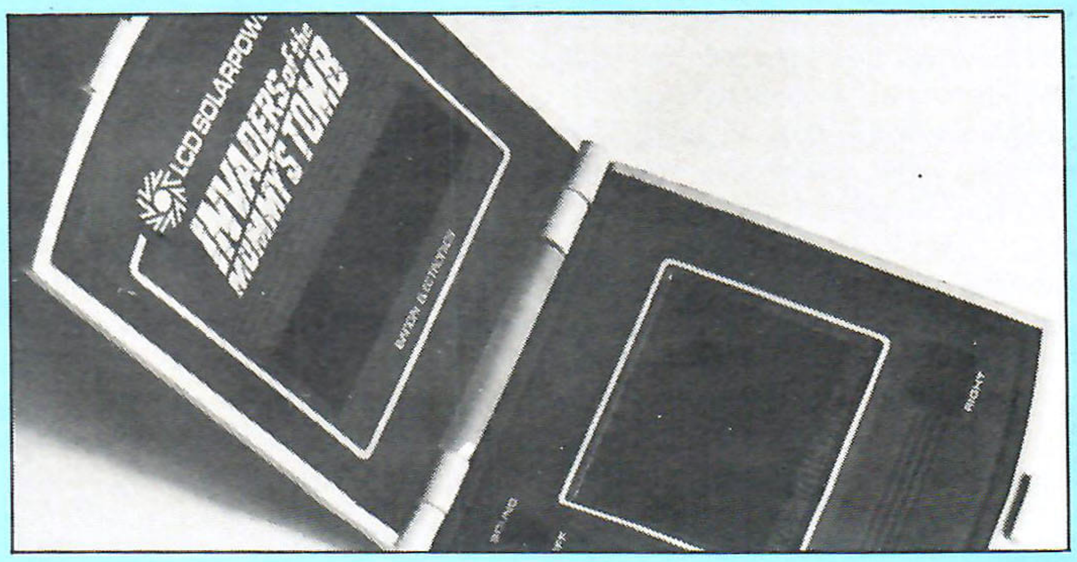


shade darker to give it that 'used' look. These sorts of techniques really only come with practice and if the first attempt isn't all what it might be, don't give up! (Price of the Airfix *AT-AT* is around £6.00 in their series 10 range).

Still with *Star Wars* and the latest kit is Boba Fett's space-going 'orbital sander', *Slave 1,* complete with deep-frozen Han Solo. The model, like the *AT-AT,* is a godsend to the 'dirtying-down' enthusiast for the 'original' is even tattier than the *AT-AT,* with paint peeling off all over the place. Construction, as with the majority of these kits, is easy enough and a more detailed examination of the kit will appear in a future issue. Thanks to Tom Scott of MPC for the sample, and to Andy Yanchus for organising it. UK price and availability has yet to be announced. **MI**

small, measuring only 65x75mm when closed, which may belie the quality and complexity of this excellent product; LCD graphics, for example, give a well defined and easy-to-follow picture. The solar-powered element may, at first, seem a bit of a gimmick, but you will never have to buy batteries and the game works perfectly well from either sunlight or the electric light in an averagely-lit room. The game retails for £18.00 in the UK and is distributed by the recently-formed Bandai, UK., Ltd of 246a High Street, Guildford, Surrey, who kindly supplied the review sample. Top marks to Bandai UK for this clever and absorbing game which has kept the small staff of *NV* out of mischief for many hours!

The amazing Solar-powered 'Mummy's Tomb' hand-held game from Bandai UK, Ltd. Quite remarkable value for money and no batteries!



BANDAI UK

'Invaders of the Mummy's Tomb', a new solar-powered game from **Bandai UK,** consists of two patterns operating inside, and outside, a pyramid. The game starts with the explorer outside and the object at this stage is to score points by destroying a scorpion and cobra before they 'attack' the explorer's camel. Each time they reach the hapless ruminant you lose one of your three lives. If you succeed in scoring 500 points a door in the pyramid opens and you may enter. The second phase of the game consists of the explorer dodging both a mummy and a spider in order to grab the treasure from the chest on the far side of the tomb. If you are caught by the mummy, or spider, the game reverts to the outside of the pyramid. Further, not only does this demanding little game consist of two patterns but it also has two *skill* levels.

The hand-held unit itself is very

Bandai UK have informed us that they will be selling their solar powered games in conjunction with the other exciting battery-operated electronic games produced by the parent Japanese company. Bandai also specialise in diecast character merchandise and collaborate closely with TV and film companies to produce exciting tie-in models. Now available on the UK market are models based on the popular TV cartoon series *Battle of the Planets,* which the BBC is repeating. Over 80 half hour episodes have been filmed, and past viewers of *Swap Shop* will already know what to expect.

Bandai UK's MD, Mr Nigel Loveland, has emphasised that his company is not just another agency, but a genuine establishment of a new UK company which, 'will be largely in control of its own destiny'. **IA**

GAMA

Luigi Colani sounds as if he could

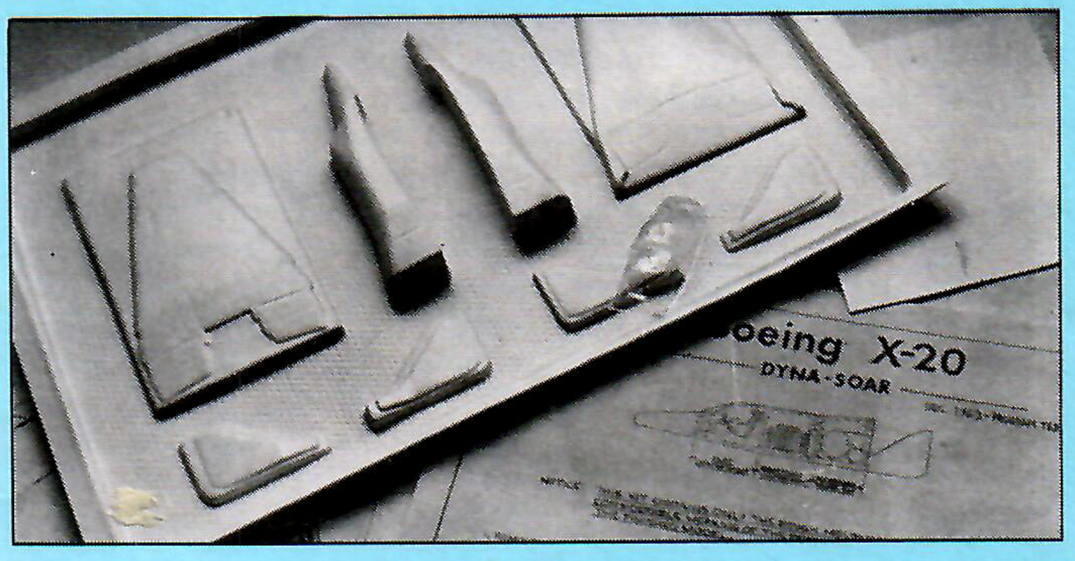
The Gama Colani Truck and Sea Ranger (above) are a pair of unique diecasts from Northern Marketing. Unusual models, and accurate to the last detail. Photos: Mat Irvine.

be an Italian but he is, in fact, a German designer/inventor whose creations have a definite individual look to them. He designs anything and everything from toothbrushes to trains, from ski-boots to sports cars. Probably his most famous creation is the *2001 Truck*. Colani doesn't appear to like straight lines and practically all his designs are based around curves. The 2001 Truck, which has been built as a full-size prototype, echoes this and has as much resemblance to current trucks as the Space Shuttle does to the Wright Brothers' Flyer. One would have thought that this design, or for that matter several Colani designs, would make ideal kit subjects, but to date it has been the diecast market that has provided the miniatures. The 2001 Truck from **Gama** isn't new but it's worth a second look. A large diecast – I would reckon around 1/43rd scale – it conveniently matches the smaller range of **AMT** trucks as well as the majority of other diecasts. The tractor unit is the most startling feature, with its totally un-trucklike cabin, circular windscreen and three-bladed wiper.

The model also demonstrates a unique feature of getting the driver out of problems. To avoid the invariably fatal result of a head-on collision, the 2001 Truck has its entire cab mounted on rails which, in the event of a head-on crash, propel this part up and back, away from danger. Controls are through flexible couplings, so the driver can retain control even from this seemingly precarious perch. The model comes with a relatively standard box van, but a tanker version is apparently also available. A more recent diecast from Gama is another Colani design – the Sea Ranger. This is a sort of ocean-going cross between a Range Rover and a DUKW and is tastefully moulded in white metal and green plastic. The rear of the vehicle features a seat, of the type used for deep-sea fishing, and an antenna which my non-existant German translates as something to do with satellites; communications or direction finding I would guess. Both models retail for £9.30. Gama models are distributed in this country by **BKM, Ltd.,** 43 Broomfield, Leeds, LS16 6AE. **MI**

needing an hour or two with some five-minute epoxy to complete them ready for priming. Surface detail is very good making painting an easy and enjoyable task.

These three figures are available, from **Hearne Originals,** The Firs, 10 Friars Walk, Exeter, Devon, EX2 4AY. In the next issue, we'll be presenting a special diorama based on the mounted figure and will also be explaining some painting techniques as well as providing a description of creating the scene itself. **SA**



KR MODELS

Vacuum-formed kits are a thriving industry for the aircraft modeller producing all those odd, and in many cases not so odd, types that the commercial injection-moulded kit manufacturer wouldn't touch at any price. It would be nice to think that the subjects might include spacecraft, but to date there have only been two examples. One is the German **Frankmodel** X-15 to 1/72nd scale and, more recently, a model from a new manufacturer, **KR Models.** They have produced a 1/72nd scale vacform of the *Boeing X-20 Dyna-Soar,* which got as far as the mock-up stage in the early 1950s and to have been launched on top of a Titan 3C launcher. It would have served the early US space station MOL (Manned Orbiting Laboratory) but plans were dropped after the initial work had been done and the Dyna-Soar never got further than the full-size mock-up stage.

The KR vacform kit is not one for beginners, requiring a lot of work by the builder to produce the finished model. Parts include a sheet containing the main body parts, a small plastic card sheet for bulkheads, etc., and a clear cockpit canopy. A very full blueprint-type instruction sheet is included along with plans and detailed sketches. No importer as yet in the UK, but the address of KR Models is PO Box 5, Shelby, Ohio 44875 0005, USA. **MI**

Mounted male barbarian (shades of Conan!) from Hearne Originals of Devon. Model is to be featured in-depth next issue.

HEARNE ORIGINALS

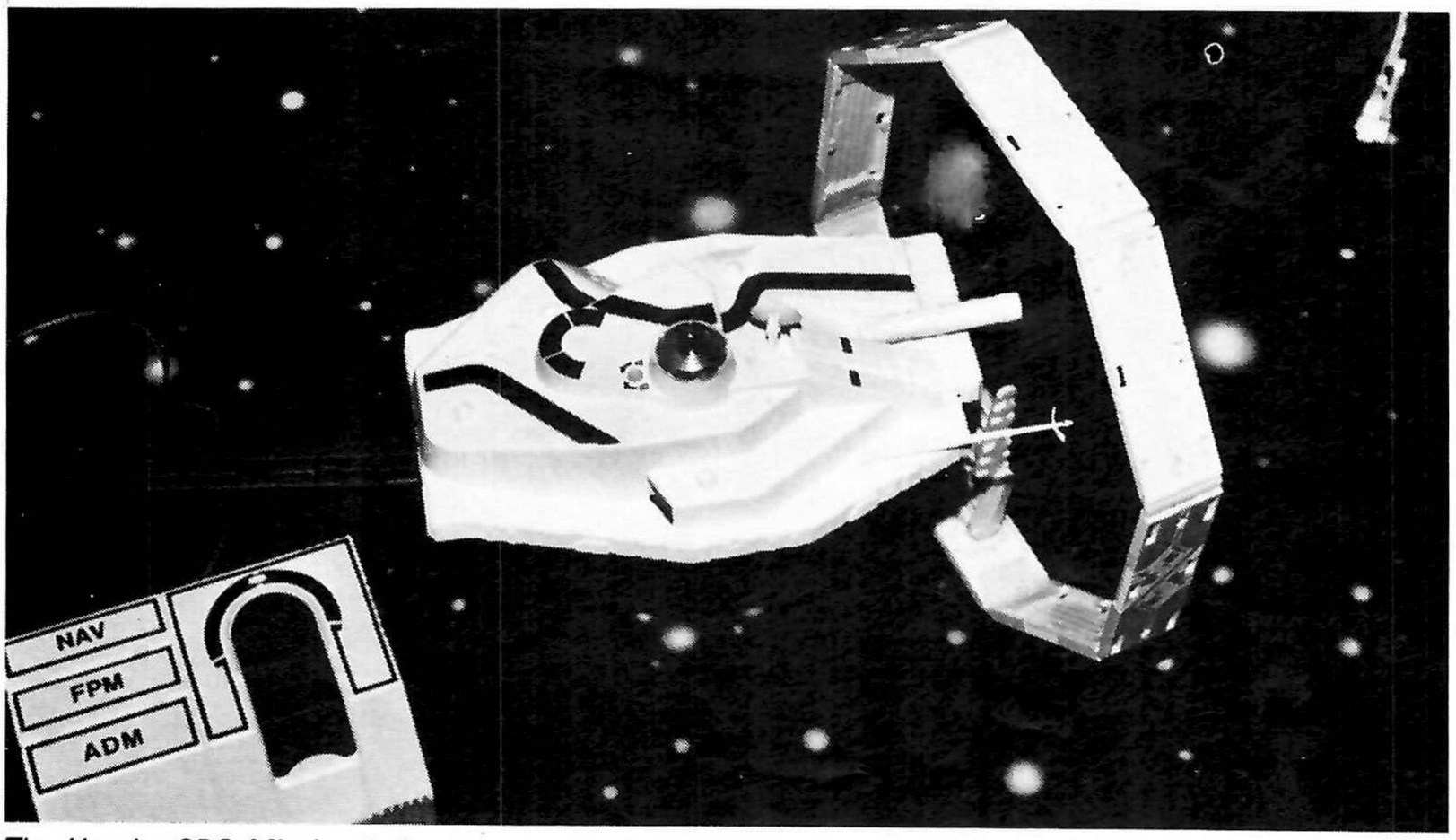
Although these figurines are not brand new they are worth a mention. The Hearne factory range includes a male barbarian (£5.75), female barbarian, (£5.35) and a male barbarian, on horseback (£16). Each figure adopts a fairly dramatic pose and just cries out for a diorama-type setting to oppose a fiend or foe of your choice.

The kits are of white metal composition and comprise very few parts for each figure; only

HORNBY HOBBIES

For many years the name of **Hornby** has predominated the model railway scene and, despite a rocky ride in recent times, seems likely to enjoy its position for a long time to come. Now Hornby Hobbies have entered the 'space age' at last with the launch of their *3DS Mission 1.* I suppose you could call it a sort of 'Space Railway' although it's really a sophisticated type of monorail. The set includes a spacecraft-dubbed *Hypercruiser* – several feet of monorail track, mounting pylons (*Skyhooks*), hexagonal shaped rail supports (*Stargates*), speed controller, three poster-sized sheets of star-spangled background material, a hand-held *'Alien Photon Gunship'* and full instructions.

The actual design of the track is such that it can be mounted on the floor, run up a wall and across the ceiling, although, naturally, additional track sections will need to be obtained if you wish to expand the system in this way. It's the *Hypercruiser* that runs on the track and once the power is switched on, two beacons are illuminated. Use of the light-sensitive 'gunship'



The Hornby 3DS Mission I showing the 'Hypercruiser' on its rail, a 'Stargate' and the control box. Star-spangled background (supplied) aids realism.

– directed onto the top beacon – results in obtaining a score (up to 99) whenever a 'hit' has been recorded. Electronic sounds from the battery-powered 'gunship' also register a strike.

Once the *Mission 1* contents have been studied, construction of the basic elements can be undertaken quite quickly and the *3DS* can be operated after about 15-20 minutes assembly. Our immediate reservation concerned the low speed of the *Hypercruiser*. We fully expected the unit to charge around the track like a slot car but due to the low gearing (thus enabling the vehicle to climb vertically) progress tends to be rather on the lethargic side to say the least. It will be interesting to see how Hornby develop their system but we can't help feeling that many youngsters may find it all a little dull unless the Margate technicians can find a method of speeding up the vehicles. Suggested retail price is unquoted at press date although release of the *Mission 1* is imminent **RLR**

HERITAGE ACRYLIC PAINTS

Fantasy games and modellers are well-served by **Heritage USA** of Dallas, Texas with their extensive range of water-based acrylic colours. In the UK, a ½ oz. jar of Heritage paint retails for 60p and their Fantasy/SF range includes over 35 different shades from *Fireglow* and *Green Slime* to *Laser Blue* and *Nubian Flesh!*

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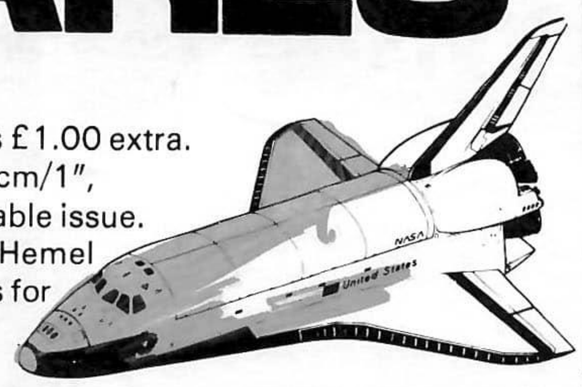

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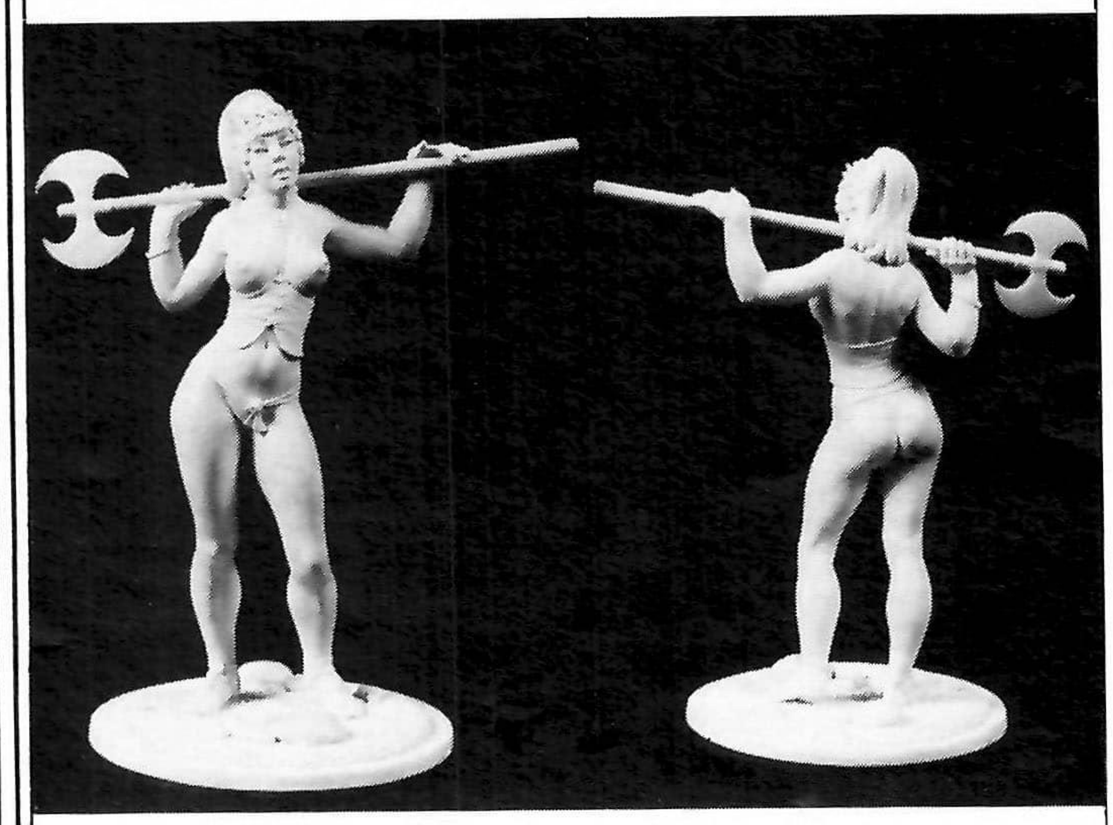

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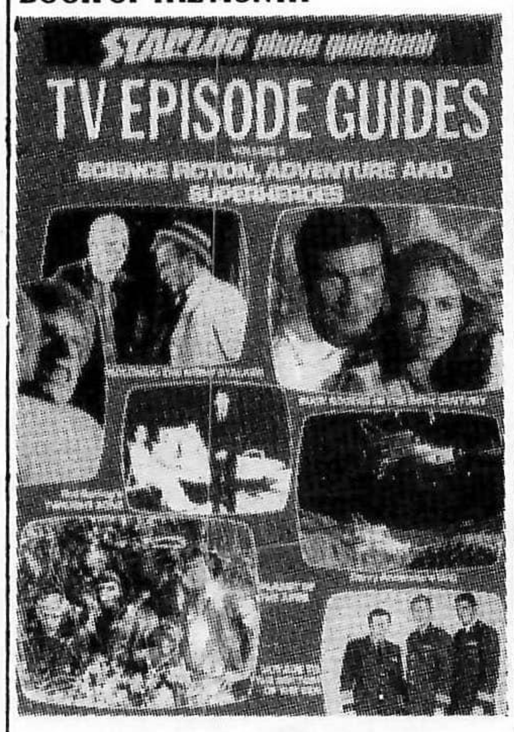

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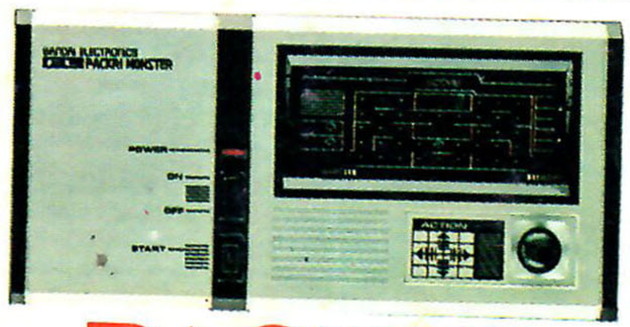
BREAKOUT and SUB ATTACK are the other solar powered games in the range. Each have their own scenes with various hazards and obstacles to challenge your playing skill.

CROSS THE ROAD

A multi-function LCD hand held game and clock with two levels of skill. Get safely across the busy road and onto the bus to score – get knocked over and you lose one of your three "lives".

Juggling SEAL

The trainer throws balls for the seal to head into the basket. But the seal must be on its stand to head the ball. If you miss a ball you lose a "life". Another multi-function LCD game and clock complete with long lasting batteries.

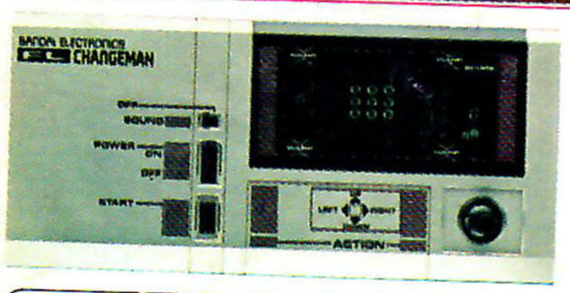


PACKRI MONSTER

Player uses the joystick controller to move the demon within the corridors. The demon eats green spots to score points. The demon must avoid being eaten by the Bogey-man. The Bogey-man turns "Coward" when the demon eats the red spots. When the demon eats the "Coward Bogey-man" quickly, the player scores bonus points.

Frisky Tom

The game is played by using the joystick controller and attack button to develop a flow of water through pipes into a bath tub. Mice gnaw at the pipes and cause leaks. Tom the Plumber must react quickly to repair them.



CHANGE MAN

Use the 4 direction joystick controller to move "CHANGEMAN" to catch the red "BOYS" and put them in the circles.

Fill all the circles to win – but beware of the monsters who can catch and eat you up.

Let the monster eat you 3 times and the game is over.

BANDAI

12 MONTH GUARANTEE All of these exciting products

BANDAI UK LIMITED Guildford, Surrey